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BEGINNER, INTERMEDIATE & ADVANCED PROJECTS

SEPTEMBER 2010

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TOOLS

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PLUS

Learn to use it so your **stones don't wiggle**

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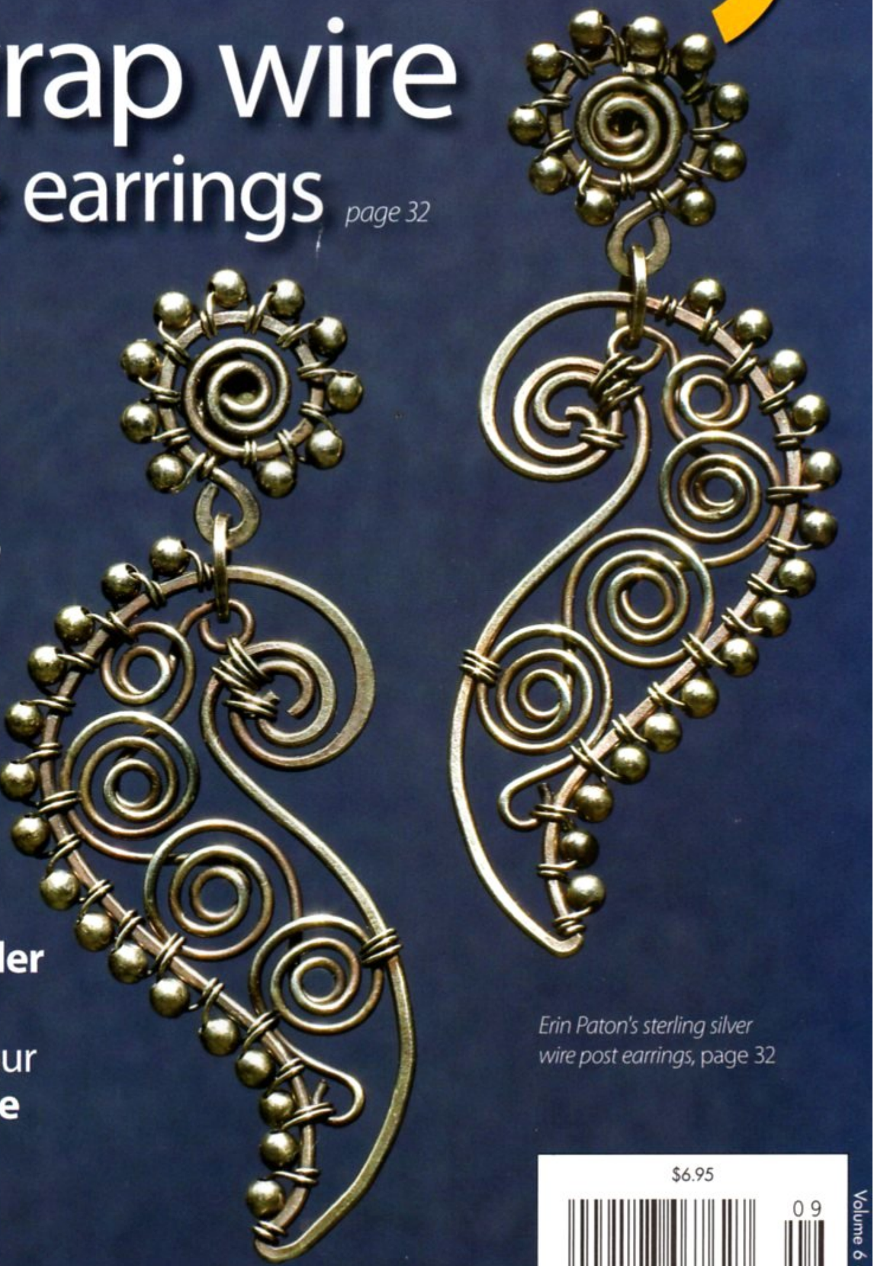

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www.ArtJewelryMag.com

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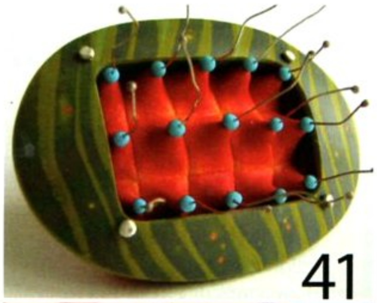
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bonus subscriber article

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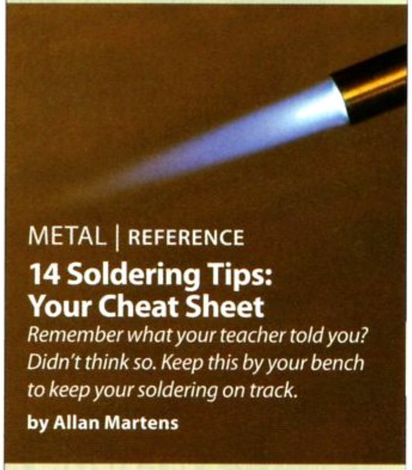

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by Allan Martens

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video section

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» **Watch a workout video just for jewelers — ergonomic hand exercises!**

» **Learn how to fuse jump rings and metal sheet.**

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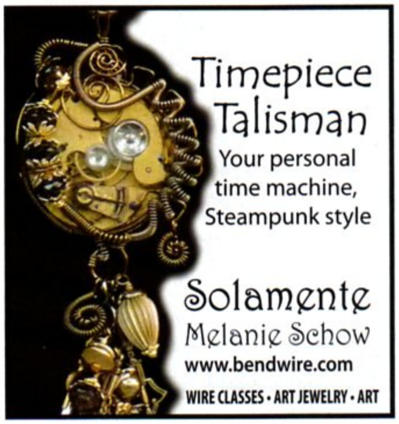
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"(when time from time shall set us free)
forgetting me, remember me."
in time of daffodils, e.e. cummings

The ouroboros may represent the eternal recurrence, where time is not linear but cyclical. The mandrake root is traditionally used in spells for transformation.

ANNE CHOI
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What's a cool thing you've done to customize your workspace or tools?

"I took over the family room (after the last of the sons left home) and made use of several three-position tables, in addition to my jeweler's bench, to allow me to dynamically customize my bench space to accommodate whatever projects I am working on."

—John Fetvedt

"2 Metals, 2 Chain mail Patterns," *page 50*

Contact: fetvedt@mindspring.com

"I bought one of those ice cube trays that has cylinders that make ice shaped to fit in bottles. I use that to organize my tools on my workbench. It keeps things separate but handy."

—Jackie Truty

"Embed Brass Wire in Metal clay," *page 60*

Contact: jackie@artclayworld.com

"I use a wooden lazy Susan designed to hold children's scissors to keep all of my pliers handy. I store pliers of like use, e.g., roundnose, cutters, etc., in the same section. A turn of the handle brings any needed pair for quick use."

—Jean Wilson

"Ergonomics for Jewelry makers," *page 46*

Contact: fun2create@yahoo.com

"I made a simple workbench to suit my height. I bought a cheap particle board bench top and added sturdy recycled timber legs and a back board for hanging tools (also recycled). Adding the legs myself allowed me to make the bench exactly the height that suits me and saves my back!"

—Erin Paton

"Sculpt Swirls of Wire into a Pair of Post Earrings," *page 32*

Contact: earringsbyerin.etsy.com

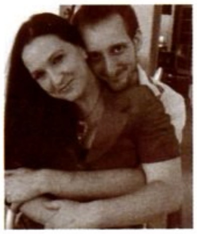
"I recently purchased a 'headboard' for my bench. This allows me to better organize my small tools and yet make them immediately available to me. Otherwise, my workspace has not changed much for the past 10 years."

—Donald C. Dietz

"Prevent Wiggly Stones with Improved Bezel-roller Techniques," *page 54*

"A Good Bezel roller is Hard to Find — So Make Your Own!" *page 58*

Contact: dcdietz@live.com



"Mark is a lapidary artist and passionate gem collector. We have our 'inspiration shelves' covered in mineral and rough gemstone specimens, such as dinosaur bone and rough opal. When I design jewelry, I look up at our shelves and it helps me come up with ideas for what type of gemstone I should have Mark custom cut for that particular design."

—Jessica Dow and Mark Anderson

"Think Two Prongs Can't Secure a Stone? Think Again!" *page 64*

Contact: dow_jessica@yahoo.com AJ

become one of our contributors!

For our guidelines, go to ***www.artjewelrymag.com/submit.***

reader forum

Our readers share their questions and comments.

Viking Knit question

I just purchased the PDF "Viking Splendor" (March 2005) from your website. The article features what is obviously a homemade drawplate, but there's no indication of the sizes of the drawplate holes. Could you find some information on this? I'm sure others must be a little stymied as well.

—Michael Johnson
via e-mail

We contacted the author, Anne E. Mitchell, to answer this question. The drawplate was made by a gentleman who passed away a few years ago; Mitchell asked EuroTool to make reproductions. The hole sizes range from 1.2 mm to 6.5 mm. The drawplates are available from EuroTool (www.eurotool.com), Rio Grande (www.riogrande.com), and directly from Mitchell herself (www.annemitchell.net).

Torch-fire question

Help! I have fallen in love with the "Easy Torch-Fired-Enamel Necklace" in the May 2007 issue. Please please tell me what colors of enamel were used so I can source them over here in Ireland. I make jewellery as a hobby, and this is the nicest thing I've seen in ages.

—Catherine Leonard
Belfast, Northern Ireland

Associate editor and project author Jill L. Erickson responds: *I concentrated on transparent lead-free enamels in blues and greens. Enamel suppliers generally have color catalogs that will show what the colors look like when fired. It can be a bit tricky to get a true red or juicy yellow. You could use opaque colors, too, which might be more solid-looking. I used a black on some of the ends to provide a bit of contrast to help the other colors pop a bit.*

And here's a great shortcut: If you ball up the fine-silver wire and add a clear glass seed bead, you can build up a nice note of enamel color very quickly. Thread the bead on the balled-up wire, heat the glass bead, and dip it in the enamel! Just be sure to allow the heated enamel to air-dry. Do not quench the enamel in water; that creates thermal shock that will cause the glass bead to shatter. And always wear eye protection.

Praise for July

I just received my July 2010 *Art Jewelry.* In a word — Wow! I love the magazine, but this particular issue just knocked my socks off! As a watercolor artist and beader, I feel the colored pencil on copper article, the Studio Savvy tips, Business Savvy, Gallery (double wow!) — all of it is just wonderful! Thank you for your lovely magazine.

—Leigh Steiner
Sarasota, FL

The secret to using colored pencils on copper
Establish your brand
ArtJewelry
How to make wide-band sterling silver rings that really fit
Whip up an easy open round chain mail pattern
Try a better way to paint with gold
Use texture and tubing to make a colorful bracelet
Lab-grown vs. natural stones
DON'T MISS

July 2010

No lapidary, please

Based on this week's [online] survey on lapidary, I hope that it's not a new direction for *Art Jewelry.* There are already a couple of magazines devoted to the subject, and while it may be a temptation to add this to your very fine magazine, I for one would rather have more articles dealing with the making of jewelry, not lapidary. I want more jewelry-making options, not less.

— Jerry Fowler
Cave Creek, Ariz.

Love those bugs!

In your review of copper clay [Reviews, May 2010], you had photos of bug molds. I love them. Please tell me where they are available for sale. I have been playing with resin and bugs lately; these molds would be great together.

—Brenda Stacy
via e-mail

Associate Editor Jill L. Erickson responds: *Glad you enjoyed the bug molds, which are vintage (1960s) metal Creepy Crawler molds that I bought on eBay. I actually had a full set of these in my childhood — back in the day when adults freely encouraged their kids to play with plastic goop, electricity, and pans of water! The vintage molds are incredibly detailed. I haven't tried using resin in these molds, and I'm not sure if the resin would release from the metal.*

You can find the classic molds on eBay, or buy contemporary "remake" versions online by searching for "Creepy Crawler." Let us know how your experiments turn out!

A chiropractor speaks up on RSI

After over 20 years in practice as a chiropractor, I usually let diatribes like that of Fiona Wallace M.B.,B.S., M.A. ["RSI article causes pain," Reader Forum, March 2010] roll off my back. But a patient brought the letter to my attention, and I thought I'd respond.

The vast majority of RSI conditions are due to mechanical stress on soft tissue (ligaments, muscles, and tendons) and joints. Poor ergonomics and/or poor posture will set the stage for shortened muscles, strained tendons, and inflammation. Peripheral nerve entrapment with numbness, tingling, and pain can ensue. This may occur over months or years.

The brachial plexus is part of the neurovascular bundle that supplies nerve and blood supply to the upper extremities. It traverses the skeletal and soft tissue region of the neck, shoulder girdle, arm, and forearm and is subject to compression at any of these sites. This has been researched and discussed extensively for many years.

Many RSI conditions respond very well to conservative care that addresses abnormal biomechanics. I was disappointed that Sharon Elaine Thompson was so deferential in her reply to this highly biased letter.

—Thomas Hadjiyane, D.C.
via e-mail

Ring band size chart, please!

I enjoyed your video on making a simple band ring [www.artjewelrymag.com/videos]. However, how do you know how long of a piece to start with for sizing purposes? A size chart would be helpful.

—*Carol White*
Oconomowoc, Wis.

There's a downloadable chart posted on the Art Jewelry website. To find it, go to www.artjewelrymag.com/reference. For a chart that is specific to making wide-band rings, check out "Learn to Make Wide-Band Rings that Really Fit," by Delias Thompson, in the July 2010 print issue; there's a sizing chart on page 61.

Correction

In "Expand Your Polymer Skills with a Savvy Stretch Bracelet" (July 2010), our instructions call for Soft Glass tubing with a 1.5 mm inside diameter. The author, Helen Breil, learned that the manufacturer of Soft Glass updated their product; the tube opening is now smaller, so it's nearly impossible to string the elastic. Breil has found a workaround: She uses cyanoacrylate glue to adhere the elastic to .018-in.-diameter beading wire, almost like creating a needle, then uses the stiff beading wire to guide the elastic through the tubing. Our sincere apologies to our readers and Ms. Breil for not making this correction prior to the issue going to print. AJ

tell us what you think!

*Send your questions, comments, and tips via e-mail to **editor@artjewelrymag.com.** Letters may be edited for clarity and length.*

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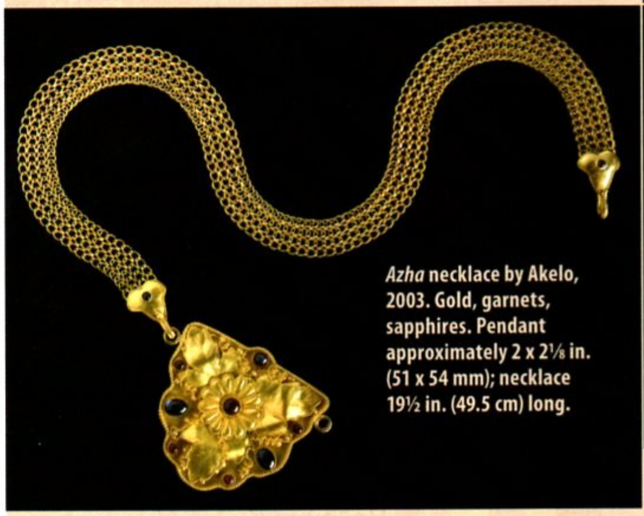
exhibit: *The Voyage of a Contemporary Italian Goldsmith in the Classical World: Golden Treasures by Akelo*

What: The exhibit presents the work of Italian master goldsmith Andrea Cagnetti ("Akelo"). The featured work represents Akelo's technical mastery and personal interpretation of ancient jewelry-making techniques.
When: Through September 26, 2010
Where: Museum of Art and Archaeology, University of Missouri, Columbia, Mo.
For more information: http://maa.missouri.edu

◀ ***Maia*** **earrings by Akelo, 2002. Gold. 2⅛ in. (54 mm).** Photos by Akelo Andrea Cagnetti.

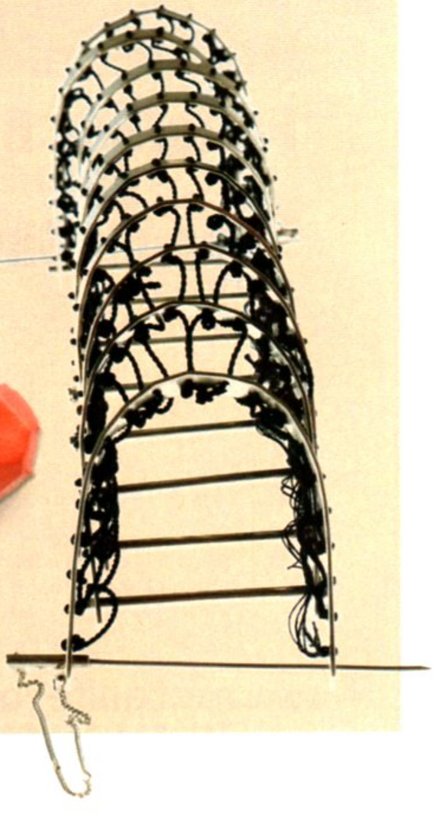


Azha **necklace by Akelo, 2003. Gold, garnets, sapphires. Pendant approximately 2 x 2⅛ in. (51 x 54 mm); necklace 19½ in. (49.5 cm) long.**

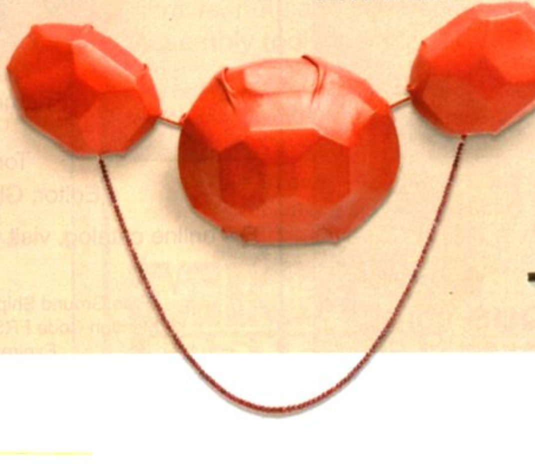
▲ ***Sabik*** **box by Akelo, 2009. Gold, topaz, moonstone, garnet, sapphire, ruby. 2 x 1 11/16 x 1 3/8 in. (51 x 43 x 35 mm).**

exhibit: *Dichotomies in Objects: Contemporary South African Studio Jewelry from the Stellenbosch Area*

What: The exhibit features approximately 150 pieces by 18 South African artists who are affiliated with the only university in South Africa that teaches conceptual approaches to jewelry making.
When: September 12–October 31, 2010
Where: Ohio Craft Museum, Columbus, Ohio
For more information: www.ohiocraft.org



▶ **Brooch/hairpin by Therese de Villiers, 2007. Silver, cotton. 14 x 4 x 2.5 cm (5½ x 1 9/16 x 1 in).**



▼ ***Rooi*** **wallpiece/ neckpiece by Nanette Nel, 2009. Rubies, leather, copper, paint, silk. 30 x 25 x 7 cm (11¾ x 9¾ x 2¾ in.)** Photos courtesy of the Ohio Craft Museum.

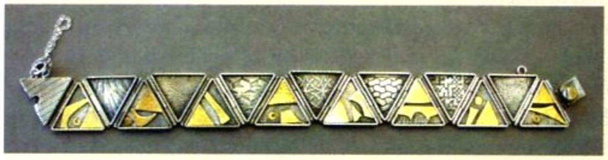
online extra

Find current information about events, shows, and workshops at www.artjewelrymag.com. Click on "Resources" to search for shows and classes by date and location.

workshops

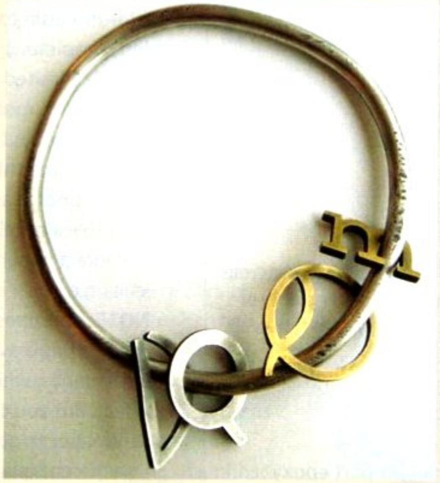
workshop: Mixed Metals: Richly Textured Jewelry

What: Artist and instructor Barbara Joiner will teach students how to combine silver, copper, and brass to make textured metal sheets for creating personal jewelry pieces. Fusing, soldering, and techniques for working with mixed metals will also be covered.
When: October 3–9, 2010
Where: Arrowmont School of Arts and Crafts, Gatlinburg, Tenn.
For more information: www.arrowmont.org



▲ Bracelet by Barbara Joiner. Etched, roll-printed, and engraved sterling silver; 22k gold/sterling silver bimetal; fabricated box clasp. 7¼ in. (18.4 cm).

▲ The staff house at Arrowmont School of Arts and Crafts.
Photos courtesy of Arrowmont School of Arts and Crafts.



▲ West Dean College campus, West Sussex, U.K.

◄ Bangle bracelet by Clara Vichi.
Photos courtesy of West Dean College.

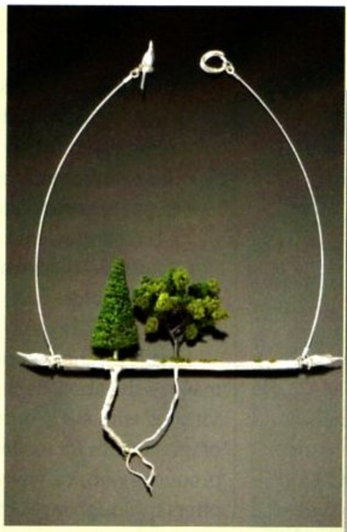
workshop: Etching, Layering, and Lettering in Mixed Metals for Jewellers

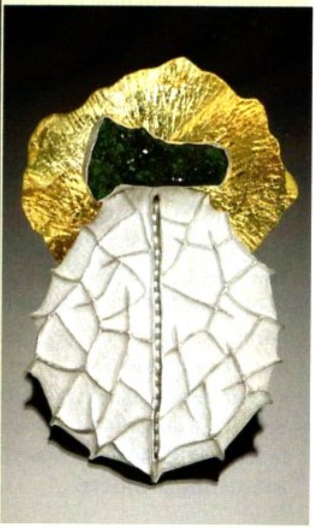
What: This weekend course taught by artist Clara Vichi will teach students about intaglio, relief etching, and oxidizing. Students will complete at least one jewelry piece.
When: October 1–3, 2010
Where: West Dean College, Chichester, West Sussex, U.K.
For more information: www.westdean.org.uk

shows

show: Signs of Life 2010

What: The show pairs the work of 10 jewelry artists with 10 writers to create a publication that celebrates both literature and jewelry art.
When: October 6–27, 2010
Where: Facèré Jewelry Art Gallery, Seattle
For more information: www.facerejewelryart.com





► *Underneath It All* necklace by Sarah Hood, 2009. Sterling silver, model railroad landscape materials. 8½ x 14 in. (21.6 x 35.6 cm).

► *Regeneration* brooch by Nancy Mēgan Corwin, 2010. Sterling silver, quartz, copper, gold leaf, pearls, fine silver, 22k gold/sterling bimetal. 4 x 2½ in. (10.2 x 6.4 cm). Photos by Doug Yaple.

from the studio

ICE Resin
Part A Resin
ICE Resin
Part B Hardener

▲ **ICE Resin has the dual benefits of a generous 45-minute "pot life," giving the user plenty of time to work, and a surprisingly clear finish.**

ICE Resin

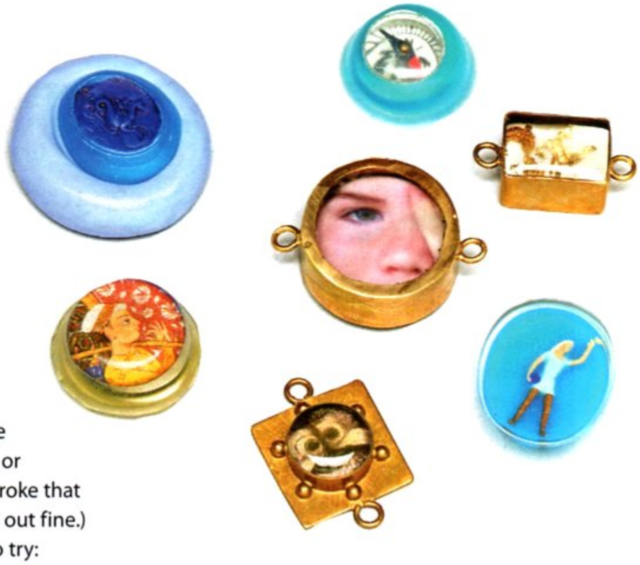
$24.00

I've tried a number of two-part epoxy resins in my day, and ICE Resin is definitely a front-runner. Why? Because it's a jeweler's-grade product that's easy to mix, pour, color, and cast. Plus, it doesn't have air-bubble issues and it's really clear. The instructions claim that it won't yellow over time. I'll have to take the company's word on that.

For your $24, you get a bottle of Part A (resin) and Part B (hardener), wooden stir sticks, plastic measuring cups, and instructions. After mixing Parts A and B, you'll have about 45 minutes to add colors and inclusions and then pour the resin before it begins to harden. That's a generous "pot life," meaning you don't have to scramble to make your creations.

you may also like

For more information on using resin, check out "Three Ways to Use Two-Part Epoxy Resin" (January 2007) and "See the Other Side of Resin" (November 2009). You can order back issues from our customer service department at 800.533.6644, or you can purchase and download individual PDFs at www.artjewelrymag.com/projects.



► **We tested ICE Resin using bezels that are available through the product's sister website, www.objectsandelements.com.**

According to the instructions, you should allow 72 hours for the resin to cure (harden completely) before you touch a finished piece or remove it from a mold. (I broke that rule, and my pieces turned out fine.)

Here are some things to try:

- Embed photos and objects in deep, open-back bezels adhered to a sheet of contact paper to keep the resin from leaking out.
  NOTE: Cured resin that faces the contact paper will have a frosted glass appearance, which can be a nice effect. But you can use wet, fine-grit sandpaper to give the resin a subtly transparent quality.
- Embed photos in closed-back bezels.
- Mix a dot of artist's oil paint with the resin to give it rich, potent color.
- Pour a layer of clear resin, let it harden for a few hours, and then pour a layer of colored resin over the first layer.
- Add inclusions, such as gold leaf, enamel glass threads, wire, and mica dust to the resin.
- Seal a photo in clear packing tape, and layer it with resin in a bezel.
- Coat paper with resin to make the paper durable.
- Make a silicone mold of an object; then pour resin in the mold to make a cast object.
- Use a rubber molding-compound to create two-part molds to make 3-D castings.
- Pour the resin in readymade plastic candy molds.

I made a variety of pieces incorporating many of the above techniques. I was satisfied with every outcome and see lots of possibilities for exploration. The product's website, www.iceresin.com, offers thorough instructions and tips on how to measure, mix, and pour the resin. You'll also find advice on choosing compatible colorants and inclusions, and instructions for coating paper with resin and capturing photos and objects. You can purchase ICE Resin at www.objectsandelements.com. *—Jill L. Erickson*

Fretz Micro Stake Set

H-2i forming stake set: $360.00
(Various other sets available)
VB1 Wooden vise block: $18.00
H-2 Micro stake tool holder: $74
H-1 Stake holder: $52.00

Forming stakes are usually quite large. They are used as supports for hammering metal into shapes, with each stake-and-hammer combination creating different results. These heavy pieces of steel are usually secured to a weighty object, like an old tree stump. These Fretz stakes look just like regular stakes but in miniature. Actually, these stakes are even smaller than miniature; at 4–32 mm (5/32–1¼ in.), they're micro.

Why would anyone need teeny tiny stakes? Because they're ideal for shaping small pieces of metal. I found these highly polished stakes particularly well-suited for detail work. I used them to shape custom bezels for oddly shaped stones and to create 3-D forms from flat sheet for hollow construction. I even added a fun coin-edge texture to the edge of otherwise dull fused jump rings.

The set that I tested came with a wooden mounting block, which I clamped in a bench vise. I then slid the stake holder into the mounting block until friction locked the holder in place. Then I selected a stake and slid it into one of the holes on the stake holder. After securing the adjustable bolts with the included Allen

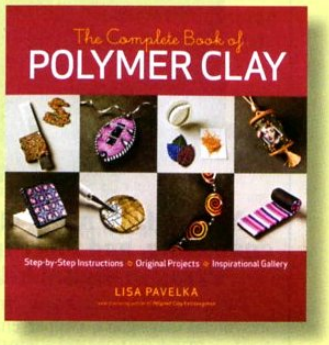
from the bookshelf

The Complete Book of Polymer Clay

Lisa Pavelka
The Taunton Press, 2010
Softcover, Full color, 221 pages
$24.95, ISBN: 978-1-60085-128-5

When you're new to a medium, it's best to start at the beginning. What *is* this stuff? What tools do I need in order to work with it? What can I do with it? What can't I do with it? Author and teacher Lisa Pavelka answers all of those questions and more. The opening chapters address clay essentials, including the properties of various clay brands, conditioning, baking, and storage, as well as the tools and supplies typically used with polymer. She is generous with tips and insights gleaned from years of working with this medium.

Colorful photographs illustrate an array of techniques. Each exercise is presented clearly and in a logical order. Pavelka's processes for achieving textile-inspired effects are inventive and appealing. The last third of the book is dedicated to project tutorials, an inspirational gallery, and an appendix filled with troubleshooting tricks. This is a must-have resource for beginners and experienced clayers alike. *—Jill L. Erickson*


The Complete Book of
POLYMER CLAY
Step-by-Step Instructions • Original Projects • Inspirational Gallery
LISA PAVELKA

Gold

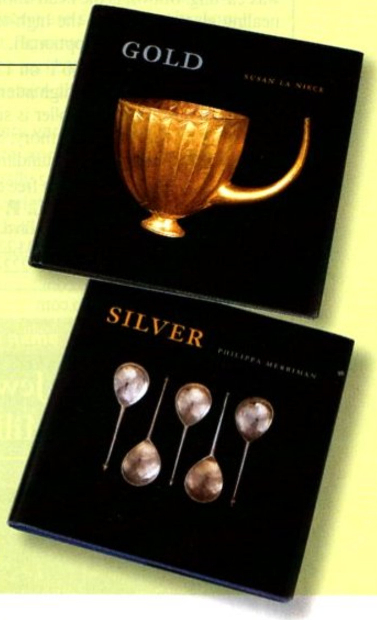
Susan La Niece
Harvard University Press, 2009
Hardcover, Full color, 128 pages
$22.95, ISBN: 978-0-674-03590-4

Silver

Philippa Merriman
Harvard University Press, 2009
Hardcover, Full color, 128 pages
$22.95, ISBN: 978-0-674-03094-7

I was captivated by these books when they arrived in our offices; one front-to-back reading and multiple scans later, their appeal hasn't lessened. These books aren't technically oriented; you won't learn how to work the metals. But you will learn about the history of gold and silver, the ways they were unearthed, how their use evolved, and their cultural importance, all in an easily digested format.

I particularly enjoyed the chapters that focus on the artisans who worked with the metals, describing the lives and the standing of smiths in various cultures. At first glance, *Gold* and *Silver* look like coffee table books in miniature; and, boy, are they beautiful. For their relatively small size, they contain a surprising amount of information about the history of these two essential metals; the authors make the most of the space available. These two volumes complement each other well, yet each easily stands on its own. *—Hazel L. Wheaton*



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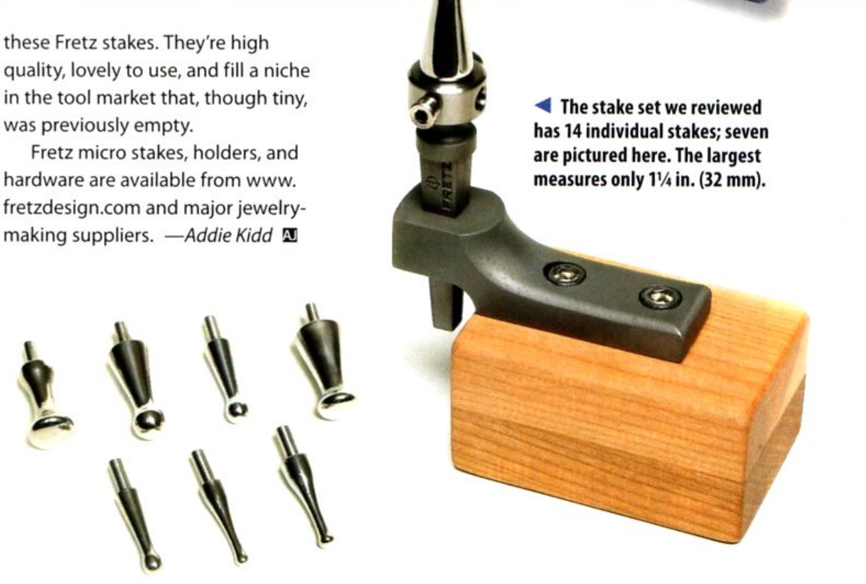
wrench, I was ready to hammer away.

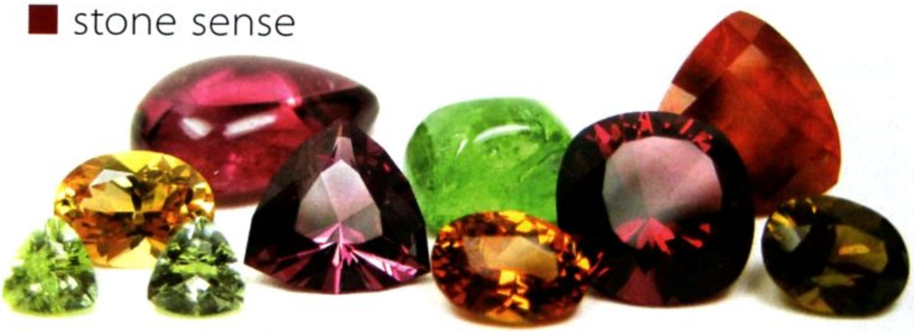
The stakes stayed securely in place as I hammered. The option of top or side mounts for the stakes made it extremely easy to position my work to its best advantage. My one complaint is that the Allen-wrench tightening system became a bother when I was switching stakes; I would prefer a finger-tightening system. But, as it is, I'll definitely buy several Allen wrenches in that size in case I misplace mine mid-project!

With a multitude of shapes, these stakes will allow you to expand your range of small-scale metal forming, creating virtually endless possibilities for hand-fabricated jewelry. I've already shared with you my love for Fretz hammers (Reviews, March 2010) and I'm no less in love with these Fretz stakes. They're high quality, lovely to use, and fill a niche in the tool market that, though tiny, was previously empty.

Fretz micro stakes, holders, and hardware are available from www.fretzdesign.com and major jewelry-making suppliers. *—Addie Kidd* AJ



◀ The stake set we reviewed has 14 individual stakes; seven are pictured here. The largest measures only 1¼ in. (32 mm).



From left to right: green and yellow grossular from Africa; cabochon and faceted Tanzanian rhodolite; green tsavorite cabochon; orange grossular; red almandine pyrope from Africa; cinnamon orange hessonite from Madagascar; and golden brown andradite from San Carlos, Arizona. Stones and photo courtesy of Out of Our Mines.

Garnet

by Richard M. Shull, G.G.

Ancient times

Red garnet cabochons are found in exquisite gold work that dates to the ancient Egyptian, Greek, and Roman cultures. Once known as "carbuncles" (from the Latin for "live or burning coal"), red garnet cabochons were carried as talismans by ancient explorers who trusted that the stones would protect them during the dark evening hours. Did the stones really glow? Not exactly. We now know that it's the high refractive index of garnets that allows them to appear bright and sparkling under low-light conditions.

Remarkable mineral varieties

The modern "garnet" is believed to have come from the word "pomegranate," because garnet crystals resemble the fruit's red seeds. And though it's true that the most abundant and well-known garnets are of the red varieties, garnets actually occur in a rainbow of colors.

Garnets are a group of minerals with similar chemical compositions. Many of these minerals overlap or combine chemistry, which creates a variety of colors that are not seen when each mineral is in its pure form.

Garnets have been more popular in the last 100 years than ever before. And that's because of the discovery of garnets in vibrant colors like orange, green, yellow, pink, and even color-change varieties that rival fine alexandrite. The availability of these varieties has boosted the demand for garnet. Check out the chart, *right*, to learn about garnet mineral varieties, their colors, common names, and where they've been discovered.

Richard M. Shull, G.G. can be reached via e-mail at info@outofourmines.com.

garnet tidbits

- Star garnets are red to purplish in color and exhibit a six-rayed star similar to star sapphires.
- In 1885, workers that were excavating the New York City subway tunnel discovered a garnet crystal weighing more than 9.5 pounds (4.3 kg).
- Green garnets are the most rare and expensive stones in the garnet group.
- Demantoid garnets have dispersion (the ability to refract light into its spectral colors) higher than diamond.

garnet: jewelry use & care

Mohs hardness: 6.5–7.5

Suitable uses: Garnets are durable, hard, and lack cleavage planes. They're suitable for rings, bracelets, pendants, and earrings.

Cleaning: It's best to use warm soapy water. Generally, almandine and pyrope are safe in an ultrasonic cleaner. However, other garnet mineral varieties can be damaged by abrupt temperature changes.

Cuts: Rare varieties like demantoid, tsavorite, and color-change garnets are usually sold as faceted stones. Other varieties can be purchased as cabochons. Almandine is often made into beads of various shapes and cuts.

Mineral varieties	Color(s)	Common name	Source
Almandine	🟫 Brownish red		USA; Africa; India
Andradite	🟨 Yellow 🟧 Gold		Arizona
	🟩 Green	Demantoid "diamond-like"	Ural Mountains, Russia
	🟫 Brown		Arizona
	⬛ Black	Melanite	California
Grossularite	🟨 Yellow	Mali	Africa
	🟩 Green	Tsavorite	Kenya; Tanzania; Madagascar
	🟥 Red 🟫 Brownish orange	Hessonite	Madagascar; India; California
Pyrope	🟥 Red	Ant hill, Bohemian	Arizona; Czech Republic
Rhodolite	🟥 Red 🟪 Purple-pink		East Africa; North Carolina
Spessartine	🟧 Orange	Mandarin	Spessart, Germany; Southern California; Nigeria
Color-change garnets	🟩 Green-blue (fluorescent light) 🟦 Purple (incandescent light)		Madagascar; Kenya
Garnet "hybrids"	🟧 Pink-orange	Malaya	East Africa
Star garnet	🟥 Red 🟫 Purple-red		Idaho; India

Fix Your Screw or Tap Mishaps

by Christopher C. Darway

► I made *It Rings a Bell* from silver metal clay and gears, using taps, dies, and embedded screws. When you turn the crank, the fist strikes the bell. 3 x 3 x 1½ in. (76 x 76 x 38 mm).

All cognacs are brandy, but not all brandies are cognac. Just as all screws are inclined planes but not all inclined planes are screws. If you consume enough cognac or brandy you will screw up your brain cells and end up in an inclined position. Reading Jill L. Erickson's article "The Nuts and Bolts of Threaded Connections," in the May 2010 issue, made me recall all the things I screwed up over the years and how I fixed those mechanical indiscretions.

3 ways to extract a broken tap or drill bit

1. Back it out. Breaking off a drill bit or tap in a piece of work can, and will, happen. If any of the bit is exposed, you may be able to extract it by hand. Heat the metal gently with a torch, or place it on a hotplate or small kiln. This will make the metal around the bit pull away slightly. Using flatnose pliers that close flush, grip the bit. Using a gentle clockwise/counterclockwise twisting motion, back out the broken tap or bit.

2. Drill it out. Whoops, it snapped off below the surface of the metal! Now what? Taps and drill bits are made from tool steel, which is heat-treated for extra hardness; you'll need to make the steel soft so you can drill it out.

Place the piece of metal in a bed of vermiculite in a kiln-safe container or on fire-blanket insulation. Heat the piece in a kiln to 1500°F (816°C), and hold that temperature for a few minutes (jewelry taps and bits are small, so there's no need for a long soak time). Do not quench the piece; allow it to cool slowly in order to make the steel soft. You can now use a fresh drill bit to drill out the softened steel.

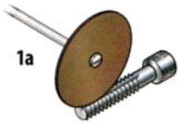
3. Dissolve it. Oops, you just snapped the *new* drill bit you were using to drill out the *old* drill bit! Head to your local pharmacy and buy alum, a powder often used for cuts and scrapes. Mix the alum with water, and soak your piece in this solution for a day or two. The alum will dissolve the steel, but leave nonferrous metals intact.

2 ways to deal with a broken or worn-out tap

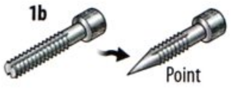
1. Reshape it. So you've snapped or worn out the tip of your best tap? You can use the flat side of a separating disk in a flex shaft to regrind the tip back into a point and carry on. Tricky, but doable.

NOTE: When you're grinding tool steel, always have a small container of water nearby, and cool the steel frequently; this ensures that you don't overheat your steel and accidentally soften it.

2. Make a faux tap. So your tap's beyond repair? You can make a poor man's tap from a steel screw. You need a flex shaft, a separating disk, and patience. Using a separating disk, carefully make one or two grooves down the side of the screw perpendicular to the threads **[1a]**. Then, using the flat side of the disk, grind the tip of the screw to a point **[1b]**. Voilà, a simple tap.



1a

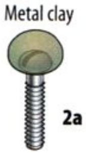


1b

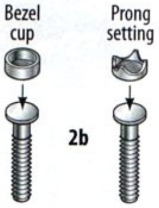
2 nuts & bolts bonuses

1. Modify your bolts or screws. To create screw-in design elements, you can form unfired metal clay over the head of a screw **[2a],** and fire it according to manufacturer's instructions.

I also like to solder bezel cups or small prong settings directly to the head of a modified screw **[2b]**. First, grind the head of the screw flat so that you have a small platform for the solder, and then use paste flux and silver solder to join bezel cups, prong settings, or other precious metal components to steel, stainless steel, or iron screws.



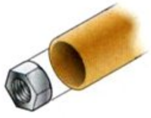
2a



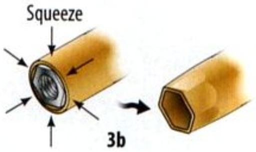
2b

2. Make your own nut driver. Need a nut driver for an oddball size nut? This tool is especially helpful in assembly — it holds and twists nuts onto their coordinating bolts, much like the lug nut wrench in the trunk of your car.

Find a short piece of brass tubing that fits snugly over the nut **[3a]**. Place the tube over the nut on a smooth surface, and use flatnose or parallel-jaw pliers to squeeze the tube against all sides of the nut until the tube conforms to the nut's shape **[3b]**.



3a



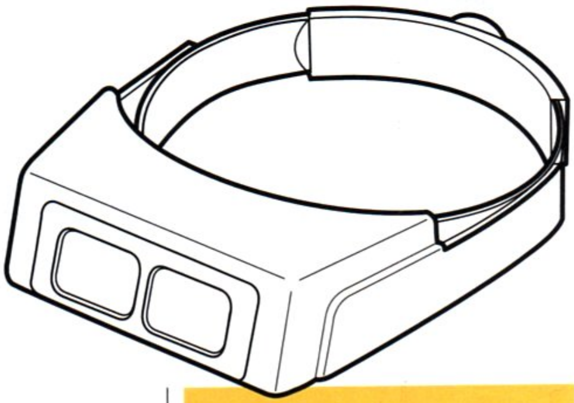
3b

People have been using screws for a long time; Archimedes is credited with inventing them. Roman engineers bent heated, triangular wire around iron to use in their hurling engines, war machines, and water pumps. Have fun fixing your screw-ups — we all make them. AJ

Christopher C. Darway can be reached via e-mail at darwaydesign@earthlink.net.

Maker, Manager, Marketer:

How to Budget Your Time When You Wear All the Hats

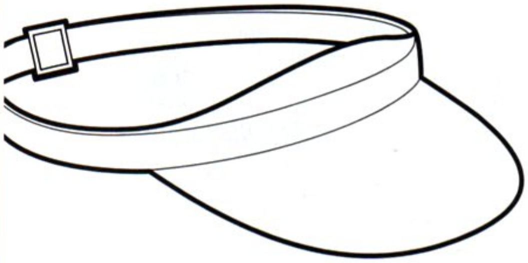


by Marlene Richey

I've heard it too many times: "How does that so-and-so jeweler make money hand over fist with a product that's clearly inferior to mine?" The answer is fairly simple. That enviable jeweler who is selling well has learned to balance his or her time between making the jewelry, managing the office, and marketing the products. I think of this balance of making, managing, and marketing as the "Triple M" approach to building a stable and profitable business.

Maker

Most jewelers go into business for themselves because they don't want to work for someone else. They want artistic freedom and the opportunity to make beautiful things for people to wear and enjoy. They are Makers. These would-be entrepreneurs promise themselves that they won't repeat the mistakes made by their former bosses. They vow, "I'll run things much better when I'm the boss." Typically, Makers quickly learn that having talent and jewelry-making skills are not nearly enough to build and run a business.



Manager

What the Maker needs is a Manager. That's the M that talks to the accountant, writes the business plan, buys insurance, pays bills, answers the phone, applies for shows, follows up with clients, and creates a price list. The Manager is the one who stands in line at the post office, does the banking, and orders supplies, among other tasks. A Maker who wants her business to remain a one-person operation must learn to wear the Manager hat. Or find an effective administrator who will wear that hat for her. If she's lucky, she has a family member who is both capable and willing to tackle these assignments.

Marketer

After sorting out the Maker and Manager conundrum, the new business owner is still on shaky ground. Enter the third M — the Marketer. Without the Marketer, success is impossible. Part private eye and part promoter, the Marketer knows how

triple m moxy

Here's a look at the key responsibilities of each part of the Triple M model:

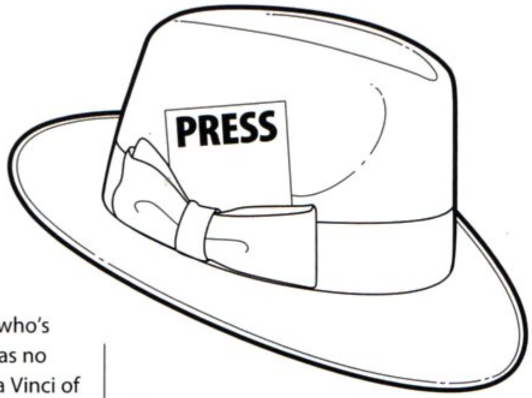
Maker
- Make jewelry.
- Develop product lines.

Manager
- Write a business plan.
- Maintain a production calendar.
- Maintain financial records.
- Establish price lists.
- Purchase materials, tools, and supplies.
- Pack and ship orders.
- Pay the bills.
- Oversee employees and independent contractors.

Marketer
- Create the brand.
- Oversee the design of all print and digital marketing materials.
- Keep tabs on market trends.
- Identify and nurture a customer base and media contacts.
- Promote and advertise products.
- Send e-mails to customers and media releases to print and online outlets.
- Establish an online presence.
- Maintain social networking sites.

In previous columns, I've addressed topics that fall in the Manager category in "Pricing Your Work in a Difficult Economy" (September 2008) and "A Business Plan: Why You Need One, How to Write One" (November 2009). And I've provided insights for the Marketer in "Selling Your Jewelry Online" (January 2009) and "Reinventing the Press Release: Courting the Media in the Internet Age" (July 2009).

to identify and reach the target customer and knows where she shops. The Marketer keeps tabs on trends and knows how to get attention and create buzz.



Success

Let's revisit that enviable jeweler who's enjoying brisk sales. Truth is, he has no illusions that he's the Leonardo da Vinci of the jewelry world. What he does have is a well-thought-out business plan, knowledge about his target market, and customers eager to buy his jewelry at a price point that earns him a profit.

He also has commitment and discipline. Whether he is wearing all three hats himself or enlisting help, he's established a balanced Maker, Manager, and Marketer work model. That's how he'll survive uncertain economic times. And how you can too. AJ

resources

- *Free Agent Nation: The Future of Working for Yourself* by Daniel H. Pink
- www.suite101.com
- http://artsandcrafts.about.com
- www.jewelrydesigner manager.com

In her more than 30 years in the jewelry business, Marlene Richey has run a wholesale business and a retail gallery. She can be reached at marlene richey@gmail.com.

formula for success

There isn't an exact ratio for how much time you should budget for each M. That said, here's a guideline for establishing a balanced schedule.

8-hour work day
Maker: 4 hours
Manager: 2 hours
Marketer: 2 hours

If you work a 40-hour week, that amounts to 20 hours making and 10 hours each of managing and marketing. Of course, there will be times in the year when you'll need to tweak that formula. For example, when you're creating a product line to fulfill an order or when you're researching the market and writing a business plan.

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Metal Forming 101: Forging

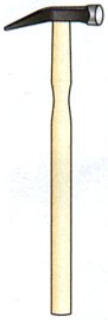
by Michael David Sturlin

One of metal's greatest advantages is that it's malleable. We can think of malleability as metal's ability to spread under the force of a hammer, and so the best way to understand malleability is through forging.

Forging means using a hammer with controlled force to shape, stretch, alter, and form metal directly. I like to describe forging as transformative sculpture — unlike additive or subtractive sculpture, forging rearranges shape without adding or removing material.

Forging tools

We use a hammer along with another steel surface, such as an anvil, block, stake, or mandrel, to shape metal. For jewelry-scale forging, you'll need a goldsmith's hammer and a stable steel surface, such as an anvil or bench block.



You don't need a large stationary anvil; a 4 x 4-in. (10.2 x 10.2 cm) bench block is adequate. A solid block that's ½–¾ in. (13–19 mm) thick is best. A wooden block with a thin steel face is too lightweight and not stable enough for proper forging.

When you're forging, the aim is to use a hammer blow to compress metal in a precise, controlled manner, which you can use to thin or thicken the metal and to spread or compact the metal.

Jewelry-scale forging is all about finesse, not force. We want to use just enough force to accomplish the task without distorting or deforming the material. Although it's possible to forge a piece of metal with almost any shape of hammer, the goldsmith's hammer will produce superior results.

One analogy I like to use with my students is that we *could* slice bread with a hatchet or play golf with a hockey stick, but the results would definitely be less than desirable! The goldsmith's hammer's long, tapered head, with its round face and wedge-shaped peen, focuses the force of the hammer blow on a small target area, achieving the most concentrated impact.

NOTE: You'll need to shape and modify the face of a goldsmith's hammer before you use it for the first time. For tips on modification, see the Metalsmithing 101 article, "Hammers 101: Highly Evolved Tools" (January 2010).

Using the hammer

Hold the hammer loosely and comfortably in your hand. Lightly pinch the handle between your thumb and index finger; extend your thumb toward the head of the hammer, and use your remaining fingers to gently stabilize the tool. Grabbing the handle in a tightly clenched fist reduces your control over the tool, and your arm will tire more rapidly.

Lift and drop the tool rather than swinging it. Keep your forearm and wrist straight. Don't swing your arm in an arc; lift your arm from the shoulder or elbow so that the hammer face stays parallel with the work surface.

Hand forging relies on hand-eye coordination, and practice will help develop your aim and precision. Your hammer blows should be uniform in force and overlap slightly, gradually changing the shape and thickness of the metal.

Although "forging" evokes images of forceful blows, the goldsmith's hammer is used for finishing as well as shaping. For coarse work, you'll use the hammer to move the metal and rough in the shape. For refined work, you'll apply the hammer more lightly and precisely to create a finely finished surface.

As the hammer blows work-harden the metal, the effect of each blow is slightly diminished and the surface becomes further refined. It's possible to achieve a smooth, even surface with a hammer alone, but in many cases the final course of tool marks leaves a pleasing texture on the metal. One of the beautiful effects of forging is the lasting evidence of the maker's hand.

Practice exercises

A few simple exercises will help develop your skill with the hammer; I think of these exercises as sketches in metal. The first four exercises are transitions, a dimensional change in the shape of the wire. For each exercise, use a 50 mm piece of 3 mm copper or fine-silver wire (either round or square), and scribe a center mark at 25 mm.

In these first two exercises, work from the end of the wire toward the center.

mm versus gauge

In jewelry making, it's best to know the real size and dimensions of our materials. Professional goldsmiths measure in millimeters (easy conversion: 1 inch = 25.4 mm), because a millimeter is an actual measurement, while a gauge is an arbitrary number. For example, both 3 x 3 mm square wire and 3.25 mm round wire are 8 gauge, but the sizes are not identical. If you learn to work in millimeters and use measurements, you will realize an immediate benefit. If you need to know what gauge your metal is, you can look it up on a chart. (In fact, there's one such handy conversion chart at www.artjewelrymag.com/reference!)

Work on the transition in sections of 8 mm to 10 mm. As each section becomes the desired shape, move on to the next section, continuing toward the center.

1 Round to square Lightly strike the first few millimeters of one end of the wire, creating a flat face with a few gentle blows of the hammer. Turn the wire over 180°, and repeat the blows on the opposing face, defining parallel horizontal faces on both sides of the round wire. Rotate the wire 90°, so the first two faces are vertical. Forge the top of the wire to create a perpendicular face. Turn the wire 180° to define the opposing face. The forged end of the wire should be square.

Working from the end of the wire toward the center, continue to define and draw the four faces inward toward the scribe mark. Work on each set of opposing sides of the wire in sequence by turning the wire 180°, then rotating 90°. This helps keep the wire square in cross section (that is, if you cut the wire in half and looked at the end, it would be square), rather than becoming rhombic.

2 Square to round Orient the wire so that one corner contacts the block and the opposing corner points upward, like a diamond shape. Lightly strike the first few millimeters of the wire, flattening the corner into a facet. Turn the wire 180° and repeat. The wire now has flat facets where the first two corners were. Rotate the wire 90° and lightly strike that corner, creating a facet. Turn the wire 180° and repeat, further defining the opposing facet. Now the wire has eight sides rather than four.

To continue the transition to round, turn the wire until another corner points upward. Lightly strike the corner, creating another facet. Turn 180° and define the opposing facet. Rotate the wire to the next corner and continue, each time working on the opposing facet until there are 16 facets rather than eight sides.

By this point, the wire should be approaching round. Rotate the wire as you strike the facets, making the shape into a series of increasingly smaller facets until no definable faces or corners remain.

3&4 Round to flat/square to flat Repeat the first two exercises to create two pieces that transition from round or square to flat. The flattened ends of the wire should become a 1 x 5 mm rectangle. You can forge the metal thinner than this to get an idea of how much it will spread, but keep in mind that shapes thinner than 1 mm can have sharp edges that are not always wearer-friendly in actual jewelry.

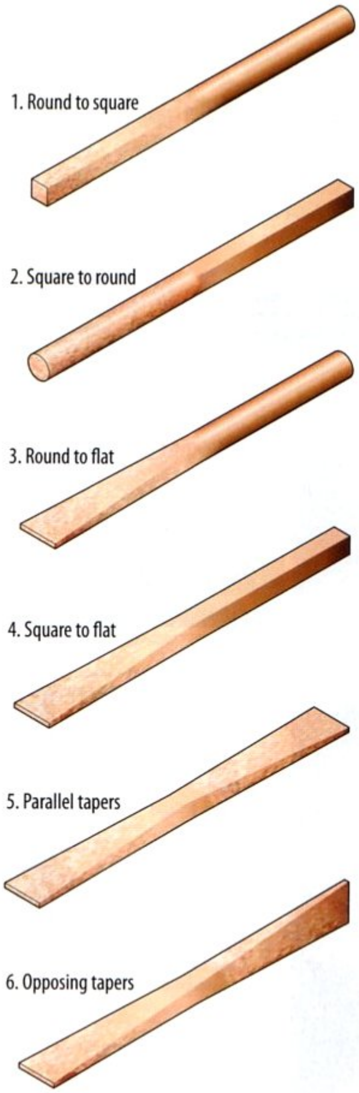
5 Parallel tapers Use a scribe to mark 20 mm from each end of a 50 mm square wire. Forge both ends of the wire into a flat taper (1 x 5 mm rectangles) so the ends are parallel. Work on the ends sequentially and incrementally so they take shape together; it is far easier to make well-paired shapes by developing them together than it is to forge each one from start to finish. The end result should be a symmetrical parallel taper.

6 Opposing tapers Scribe a center mark 25 mm from the end of a 50 mm length of square wire. Both ends of this model will be 1 x 5 mm rectangles, but one will be horizontal and one will be vertical. As the model is turned, the ends will have opposed orientations.

Forge one end into a rectangle. Turn the wire so that the rectangle is oriented vertically, then forge the other end of the wire into a rectangle. As with the previous model, it's best to work on the opposing ends of the wire alternately to develop the shapes together.

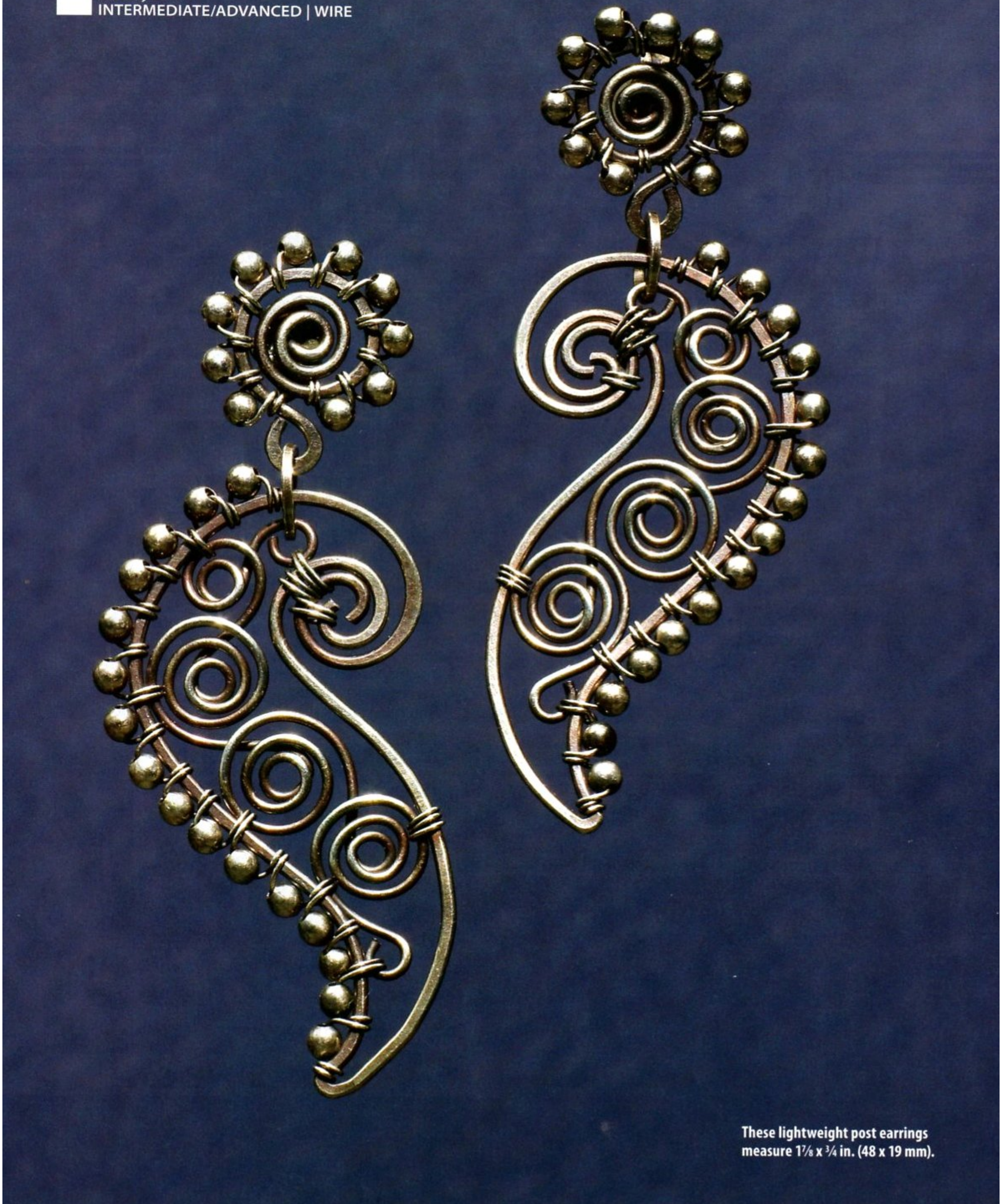
This shape is a transition and also a gradient. The vertical face at one end becomes the horizontal face at the other end. Any way you turn this model it should appear as a long, wedge-shaped object. The center should still be a 3 mm square in the middle of an even gradient from horizontal to vertical.

Forging these simple shapes is the best way to learn to control the hammer and to develop your skills. It's also a good method to begin building a basic design vocabulary of simple shapes that you can use as the basis for an unlimited number of jewelry objects.



As you practice these exercises, you'll notice that you can feel through the tool how the metal is being affected. Forging, like many other metal-forming techniques, is as much a tactile process as it is a visual one. It's all about sensitivity and perception. Becoming aware of the subtlety and finesse of the effect of the tool will enable greater artistic expression and increased fluency with the material. AJ

Michael David Sturlin is an award-winning goldsmith, jewelry artist, and educator. He can be contacted via e-mail at michaelsturlinstudio@cox.net.



These lightweight post earrings measure $1\frac{7}{8}$ x $\frac{3}{4}$ in. (48 x 19 mm).

COVER STORY

Sculpt Swirls of Wire into a Pair of Post Earrings

Use expert planning skills to construct these mirrored wire-wrapped earrings with integrated posts.

by Erin Paton

The hardest part of wirework isn't forming even loops, flowing spirals, or tight wraps; it's consistently matching your first set of bends and angles to make an identical second component, as in this mirrored pair of earrings. But with careful measuring, precise bending, and the help of a handy template, you can meet the challenge and make a perfectly matched set.

Part 1: Earring posts

Make a post component. Using flush cutters, cut a 67 mm (2⅝-in.) piece of 20-gauge (0.8 mm) sterling silver wire. Using a permanent marker, mark the wire 12 mm (½ in.) from one end of the wire. Using chainnose pliers, grip the wire at the marked point, and make a 90° bend.

Using just the tips of roundnose pliers, grip the longer wire tail at the 90° bend. The jaws of the pliers should be parallel to the shorter wire tail **[1]**.

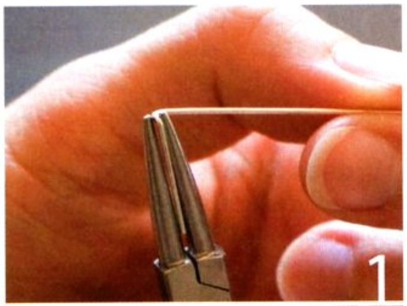
Use your fingers to bend the longer wire around one tip of the roundnose pliers, forming a tight loop **[2]**. The shorter wire tail is now the post.

Form a spiral around the post. Using roundnose pliers, continue to grip the wire next to the 90° bend and the post, and wrap the longer wire around the center loop, making a spiral 🎞 that has three revolutions total from the post.

NOTE: If you need to get a better grip as you work, switch to flatnose pliers and grip across the flat portion of the spiral.

Using pliers and your fingers, open the spiral wires to make a small gap between the outer two revolutions of the spiral; you'll need this space to attach beads later.

Using roundnose pliers, grip the end of the working wire. Rotate the pliers to form a plain loop opposite the rotation of the spiral.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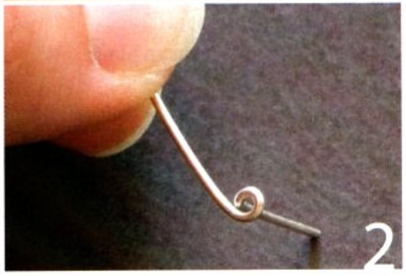
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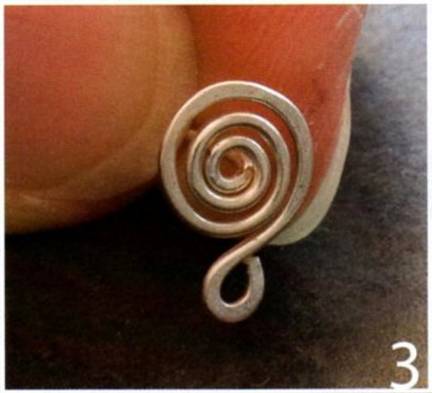
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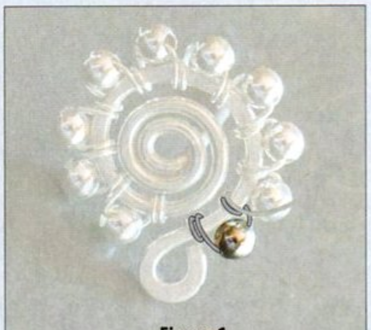
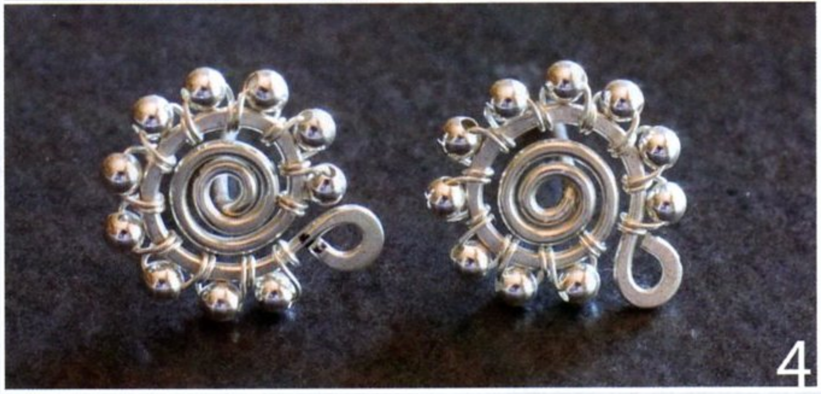


Figure 1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Hammer and finish the spiral. If necessary, use nylon-jaw pliers to adjust the spiral so that it's flat and the wires are evenly spaced.

Avoiding the earring post, place the edge of the spiral along a bench block or anvil, and lightly hammer the outside of the spiral and the plain loop, rotating the component as you work. This will flatten the spiral slightly and harden the wire. You don't need to flatten the inside of the spiral **[3]**.

Videos & Basics

Check out these bonus tutorials for fundamental techniques used in this project:

- Making a wire spiral ▣
- Opening and closing a jump ring B ▣
- Patinating with liver of sulfur B ▣

B Basics, *page 73*
▣ Videos, www.artjewelrymag.com/videos

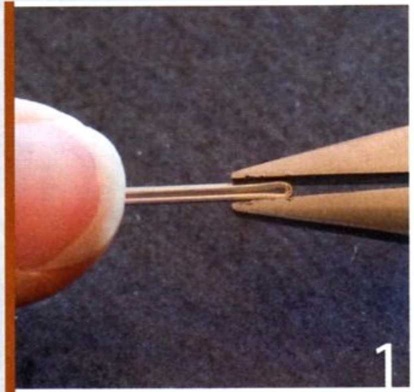
Add the first embellishment bead. Cut a 16 cm (6¼-in.) piece of 28-gauge (0.32 mm) wrapping wire. Starting next to the plain loop, wrap the end of the wrapping wire around the spiral base wire twice. Use chainnose pliers to tighten the wraps and squeeze them together if necessary.

Slide a 2 mm bead onto the wrapping wire. Holding the bead snug against the spiral base wire, secure the bead by wrapping twice more around the base wire **[Figure 1]**.

Add the remaining embellishment beads. Continue to add beads, wrapping twice between each bead, until you've added 10 beads around the perimeter of the spiral base.

Positioning both wire tails at the back of the post, trim the tails with flush cutters. Using bentnose or chainnose pliers, flatten the tails to hide them.

Make a matching post. Repeat the previous steps to create a second post that's a mirror image of the first. If your first post has a clockwise spiral, the second should have a counterclockwise spiral **[4]**.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Part 2: Dangles

Frames

Form the bottom point. Cut a 12 cm (4¾-in.) piece of 20-gauge (0.8 mm) sterling silver wire. Measure and mark the wire 50 mm (2 in.) from one end.

Using flatnose pliers, make a 90° bend at the marked point. Using flatnose pliers, squeeze the wires together until the bend's very tight **[1]**. I call this a "fold-over bend."

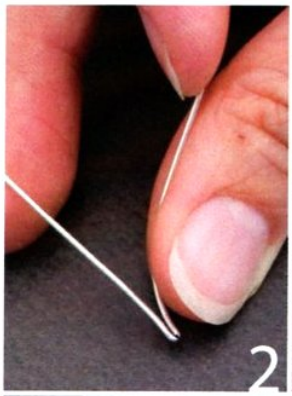
Create the frame's shape. Using your fingers, slightly separate the wire ends. Brace your thumb against the longer wire tail, and push the wire against your thumb **[2]** to create a gentle curve.

Brace the shorter wire tail against your thumb, and in the same manner, create a gentle curve with the shorter wire tail. The curve should mimic the longer wire tail's curve **[3]**.

Using flatnose pliers, grip the outside of the fold-over bend, and bend it gently, following the direction of the curves you just made; this will enhance the curved shape.

Create the frame's spirals. Using roundnose pliers, grip the end of the longer wire tail. Rotate the pliers to make an open spiral with two rotations **[4a]**. Repeat to make a matching open spiral on the end of the shorter wire tail **[4b]**. Both spirals should rotate in the same direction.

Connect the frame's spirals. Using your fingers, push the longer wire over in a curve until its spiral fits within the shorter tail's spiral **[5a and b]**.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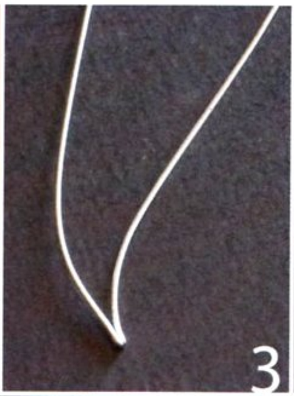
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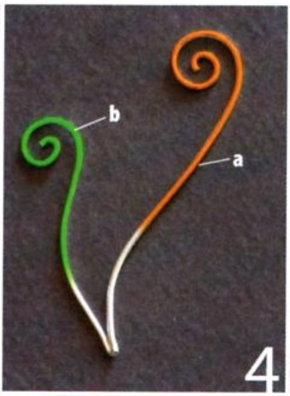

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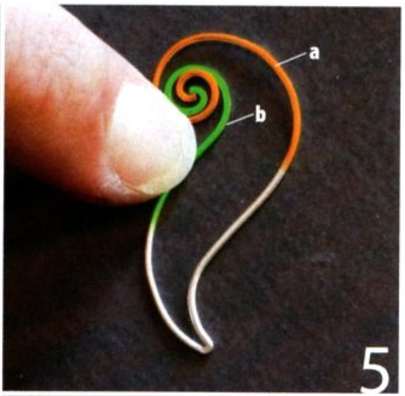

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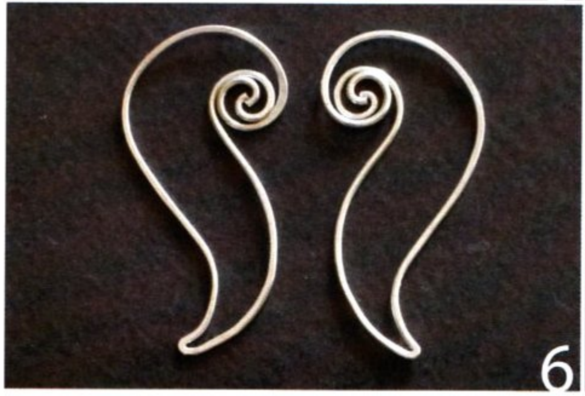
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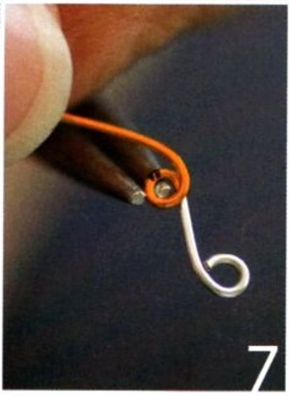
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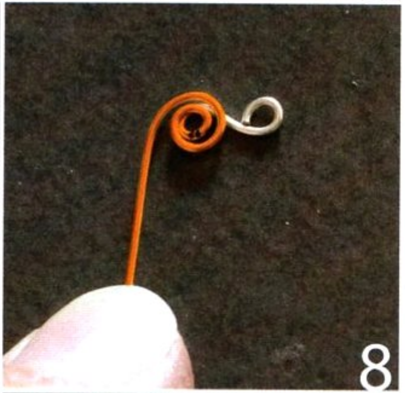
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Using pliers and/or your fingers, adjust the wire tails and the frame until the two spirals are evenly entertwined. The spirals should fit inside each other, with the ends meeting in the middle. Be patient — this will take some fiddling!

Hammer the frame. Using **Figure 2** as a template, use pliers and/or your fingers to adjust the frame until you are satisfied with its shape.

Place the frame on an anvil or bench block, and lightly hammer it with the flat face of a chasing hammer. You want to slightly flatten and harden the wire; don't hammer too much, or you could distort the shape of the frame.

Make a matching frame. Repeat the previous steps to create a second frame that's a mirror image of the first **[6]**.

Spiral centers

Make the first plain loop. Cut a 22 cm (8¾-in.) piece of 22-gauge (0.6 mm) wire. Using the tips of your roundnose pliers, make a plain loop at one end of the wire.

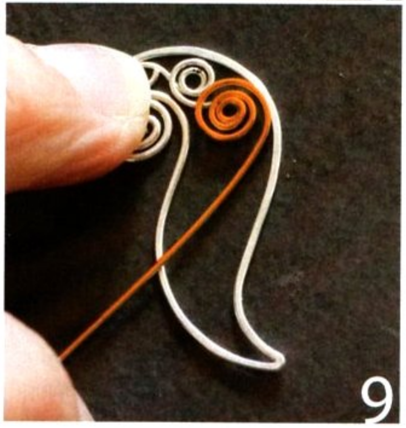
Make the first spiral. Mark the wire 3 mm (⅛ in.) from the end of the first plain loop. Using the tips of your roundnose pliers, grip the wire at the mark and make one full rotation opposite the first plain loop **[7]**.

Remove your pliers from this second loop, and using your fingers, continue to wrap the tail once more around the loop, creating a spiral that now has two full rotations **[8]**. It's important at this point to leave a small gap between these two wires so that you can attach the spirals to the frame later.

NOTE: Periodically test-fit the spiral center within the frame to make sure that it fills the center of the frame without extending past the edges.

Create the second spiral. Mark the wire 3 mm (⅛ in.) from the edge of the first spiral; this will provide enough length for a bridge between the spirals.

Making sure that the bridge is on the back of the spiral center, make a spiral as before, rotating opposite the previous spiral. This spiral should have three full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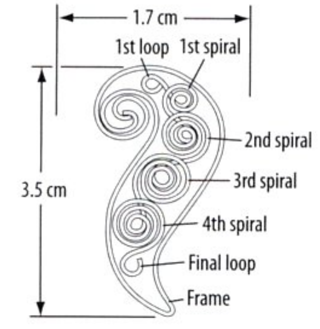
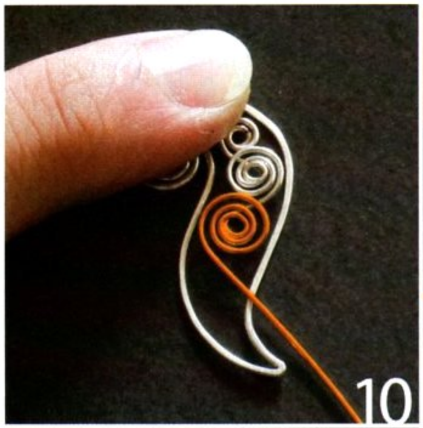


Figure 2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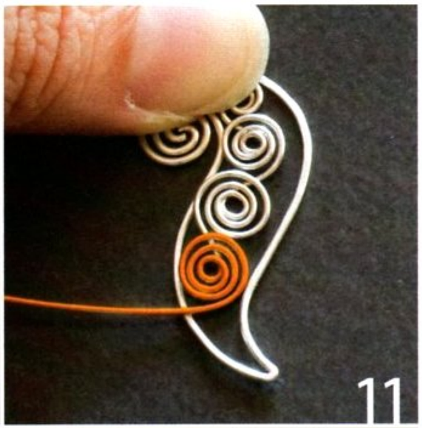
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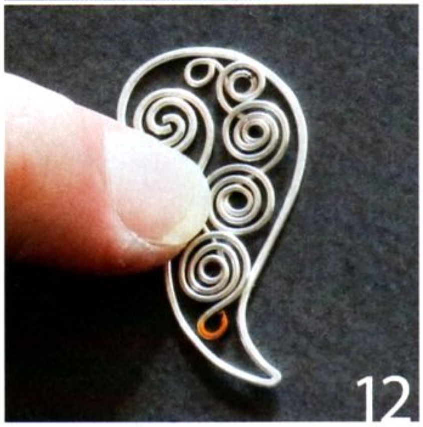
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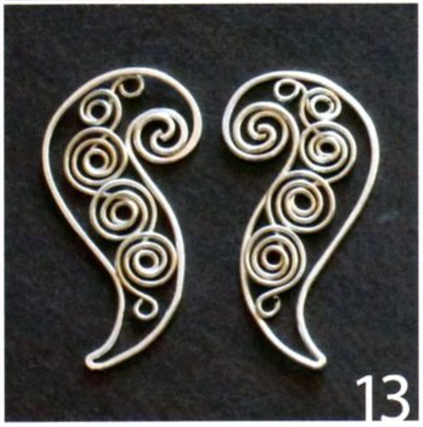
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rotations with a small gap between the outer rotation wire and the one next to it so you can attach the spirals to the frame later **[9]**.

Form the third spiral. Mark the wire 5 mm (3/16 in.) from the edge of the second spiral. Make a spiral as before, rotating opposite the previous spiral and keeping the bridge to the back. This spiral should have three full rotations with a small gap between the outer rotation wire and the one next to it **[10]**.

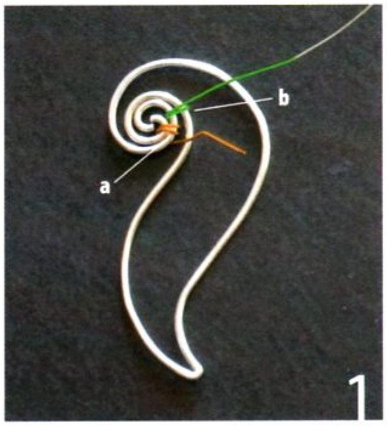
Make the fourth spiral. Mark the wire 3 mm (1/8 in.) from the edge of the third spiral. Make another spiral as before, rotating opposite the previous spiral and keeping the bridge to the back. This spiral should have three full rotations with a small gap between the outer rotation wire and the one next to it **[11]**.

Finish the last plain loop. Mark the wire 5 mm (3/16 in.) from the edge of the fourth spiral, and use flush cutters to cut the wire at this mark. Grip the end of the wire with roundnose pliers and, rotating opposite the fourth spiral, form a plain loop **[12]**.

Make a matching spiral center. Repeat the previous steps to create a matching spiral center to fit within the other dangle frame. Start with a plain counterclockwise loop so that the matching spiral center mirrors the first, with all of its bridges on the back **[13]**.

Flatten the spiral centers. Place both spiral centers within their frames. Adjust the spirals and bridges as necessary until the spirals fit well within their frames.

Place the spiral centers on a bench block or anvil and *gently* hammer them with a rubber mallet. Don't hammer too much; you want to flatten them slightly so that they're even, but you don't want to create weak spots where wires overlap.



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Part 3: Assembly

Join the spiral ends of a dangle frame. Cut a 10 cm (4-in.) piece of 28-gauge (0.32 mm) wrapping wire. Beginning at the interior side of the frame's intertwined spirals and leaving a short tail, tightly wrap the wrapping wire twice around the two spiral frame wires **[1a]**. Use chainnose pliers to tighten the wraps and squeeze them together if necessary.

With the wrapping wire positioned at the back of the frame, angle the wire up so that you can wrap twice to connect the outer spiral wire to the frame wire **[1b]**.

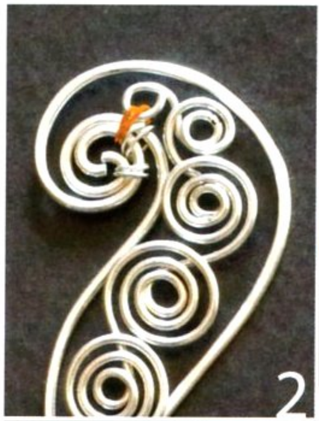
Connect the first loop of the spiral center to the frame. With the wrapping wire positioned at the back of the frame, lay the spiral center in the frame.

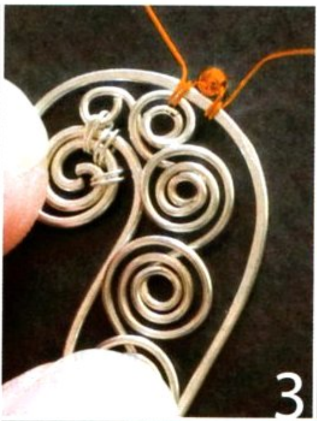
Pull the wrapping wire through the first loop of the spiral center, back around the two wires of the frame spiral, and up through the loop again.

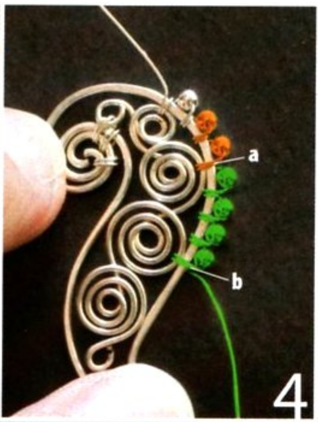
Repeat, so that you have two wraps connecting the first loop to the frame spiral. Trim the tails, and use your chainnose pliers to flatten and tuck in the wire ends **[2]**.

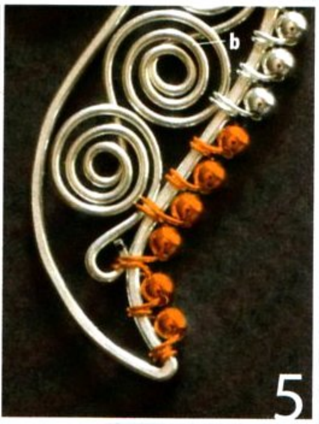
Add the first decorative bead. Cut a 30 cm (12-in.) piece of 28-gauge (0.32 mm) wrapping wire. Leaving a 50 mm (2-in.) tail and holding the spiral center in place as you work, wrap twice around the frame and the outer wire of the first spiral of the spiral center, forming a tight connection.

Slide one 2 mm bead onto the

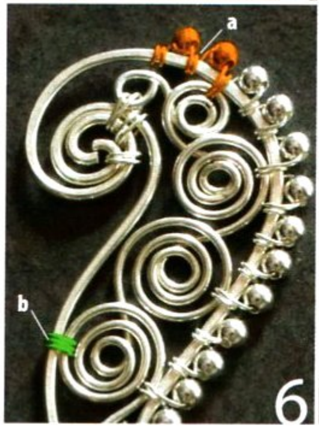


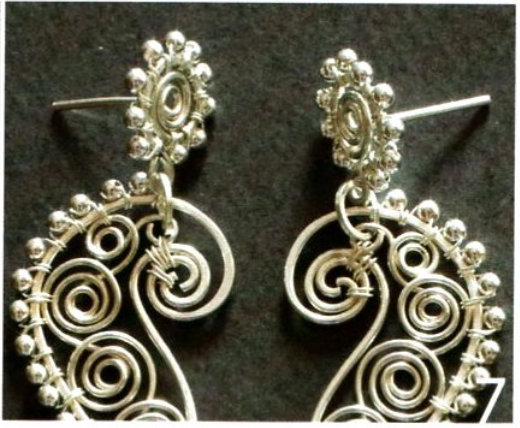






Process photos by Erin Paton.





wrapping wire. Holding the bead snug against the frame, secure the bead by wrapping twice more around just the frame wire **[3]**.

NOTE: Since the spiral center is such an organic motif, your connection points may differ from mine. Use your best judgement in selecting points at which to attach the spiral center to the frame. You may need to use more or fewer beads than I used.

Continue to add decorative beads. Add a second bead along the frame, wrapping twice after it.

Slide a third bead onto the wrapping wire, and wrap twice around *both* the frame and the outer wire of the second spiral, connecting the spiral center to the frame **[4a]**.

Add another three beads, wrapping twice between each bead. Add another bead, and wrap twice around *both* the frame and the outer wire of the third spiral, connecting them **[4b]**.

Continue down the length of the frame, adding beads and connecting the spirals to the frame **[5]**, until you reach the tip of the frame.

Positioning the wrapping wire tail at the back of the frame, trim the tail with flush cutters. Using bentnose or chainnose pliers, flatten the tail to hide it. *Do not yet trim the 50 mm (2-in.) tail that you left at the top of the frame.*

Add two more beads at the top. Slide a bead onto the 50 mm (2-in.) tail at the top of the frame. Working away from the attached beads, wrap twice to secure that bead to the frame. Repeat to add another bead, then trim and flatten the tail **[6a]**.

Attach the fourth spiral to the frame. Cut a 70 mm (2¾-in.) piece of 28-gauge (0.32 mm) wrapping wire. On the inside of the frame, opposite the beads, wrap twice around the frame and the outer wire of the fourth spiral. Positioning the wrapping wire at the back of the frame, trim the tail with flush cutters, and use bentnose or chainnose pliers to flatten the tail to hide it **[6b]**.

materials

- Sterling silver wire: dead soft, round
  - 20-gauge (0.8 mm), 37.4 cm (14¾ in.)
  - 22-gauge (0.6 mm), 44 cm (17½ in.)
  - 28-gauge (0.32 mm), 126 cm (4½ ft.)
- 2 mm round seamless spacer beads, approximately 52
- Butterfly earring clutches: 2
- 20-gauge (0.8 mm) jump rings, 4-5 mm outside diameter: 2

toolboxes, *page 76*

- Wirework
- Finishing

Find out where to buy supplies, *page 79*
See Safety Basics, *page 76*

Make a matching dangle. Repeat the previous steps to add beads and attach the second spiral center to the matching frame. Make sure that the second dangle mirrors the first.

Connect the post to the dangle. Open a jump ring B ▣ and thread it through the first single loop within the frame at the top of a dangle. Thread the jump ring through the plain loop of a post component, and close the jump ring. Repeat to connect the matching earring components **[7]**.

Finish the earrings. Add a butterfly clutch to the back of each post. If desired, and following the manufacturer's instructions, patinate the earrings with liver of sulfur B ▣. Lightly polish the earrings with a polishing cloth to remove some of the patina from the raised portions of the design.

A conversation with Brooke Marks-Swanson

Artists record their personal journeys in different ways. For Brooke Marks-Swanson, her changing landscape is reflected in her work. Vivid colors and lines change to evoke her surroundings, whether stark or lush, sharp-edged or hazy and romantic. Marks-Swanson's energy matches her creativity, and I found it both a challenge and a delight to keep up with her. —*HLW*

How did you know you wanted to be an artist?

Both my parents are artists, so I come by it pretty honestly. My parents were always very good about sharing it ... I was able to use my hands and make things, and I could make a mess and it was never a big deal! We went to antique stores and rummage sales, and my parents collected things. And all these objects around our house and handmade things by them and by their friends — it gave me a direction. From 10, 12 years old, I knew I wanted to be an artist.

What about jewelry specifically?

My mother had a box of jewelry. At the time the box seemed *huge* to me. I remember getting into her closet and pulling this box down and looking at all these fabricated silver pieces. There were these set stones and they were very geometric and kind of constructed — they were just beautiful. And I remember vividly looking at these things and wanting to play with them. Not necessarily *wear* them, but I just loved them as objects. When I took the first jewelry class, I just knew. I got it. There was this precision, the technical aspect... you had to make things fit and they had to be tight. I think the analytical part of me really flourished when I got into the jewelry studio for the first time.

I was making jewelry pieces in high school out of clay and turtle shells and stickers and Fimo. But my first time cutting metal, really figuring out patterns and making models, that happened my first semester in jewelry.

Your work now is beautifully abstract, as opposed to more classical construction—

Absolutely. I think first you learn how to make things correctly and make things fit. After that, when I learned a vocabulary and a narrative in which I wanted to work, then the work became my own. The work I was making in undergrad looks nothing like the work I'm making now! Which is good; that's a good thing. But there's still a common thread; you can still look at the work and go, 'Oh, I can see similarities.'

What do you see as that common thread?

I think the technical aspect. I've always had a good sense of craftsmanship. So the pieces now, they fit together beautifully. They don't aesthetically look the same, but they're made just as well. If you look at the back of the piece, it's constructed just as well as the front. I think you need to know how to make a piece very well and then if what you're trying to say comes out, it makes the piece even better.

How did you start using paint?

I'm from the Midwest and I've always loved the change of seasons, and the weather and the elements. The colors especially. The way the buds form on the trees — they're that acidy green — and the black and white snow when it gets plowed up from the street! My surroundings have always been such an influence on my work.

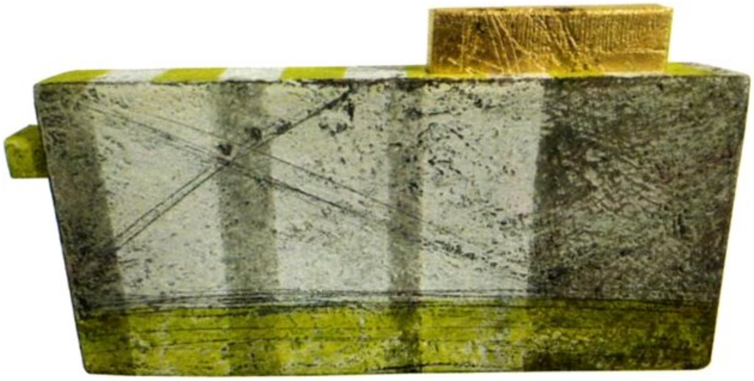
My parents collect antique toys that are painted metal — I've always loved them. And in graduate school, I wanted to color metal but not use traditional metal patinas. I kept thinking, 'Why not paint, why not paint?' I started off making these pieces that had watercolor spots in certain areas, where it kind of looked like patina — you might have thought it was something else. I was nervous to take that leap. Finally, there were two or three pieces that I thought, 'Why not paint on the surface?'

I did a lot of research and I found a primer that allows the paint to adhere to the metal. I didn't want to just throw something down on the surface and say, 'Oh, it's perfect now,' but in a year, five years, 20 years, have it flake off and not be permanent. That was important to me. It goes back to making things right.

What are some examples of how your surroundings show up in your work?

It was a little more narrative in the beginning; there were definitely horizon lines and landscapes. I think the work has become a lot more abstract. I've always been interested in aerial images, in plots of land, and farmland, and I've always been

[A] *Teapot with Stripes*. Copper, acrylic, gold leaf. 12 in. (30.5 cm) wide. [B] *Gold Rectangle* neckpiece. Copper, acrylic, gold leaf, sterling silver, patina. 2¾ in. (70 mm) high. Photo by Brittani Cole. **[C] *Shadows* brooch. Copper, acrylic. 3¼ in. (83 mm) high.** Photo by David Hugus. **[D] *Circle* brooch. Copper, acrylic. 2¾-in. (70 mm) diameter. [E] *Intersection* brooch. Copper, acrylic. 3½ in. (89 mm) high. [F] *Red Oval* neckpiece. Copper, acrylic, gold leaf, steel wire. 2¾ in. (70 mm) wide.** Photo by Brittani Cole. **[G] *Winter Aerial Plots* wall piece. Copper, acrylic. Each 16 in. (40.6 cm) square. [H] *Green Form* neckpiece. Copper, acrylic, gold leaf, sterling silver, patina. 2¾ in. (70 mm) high.** Photo by Brittani Cole.
(Photos by Brooke Marks-Swanson unless otherwise noted.)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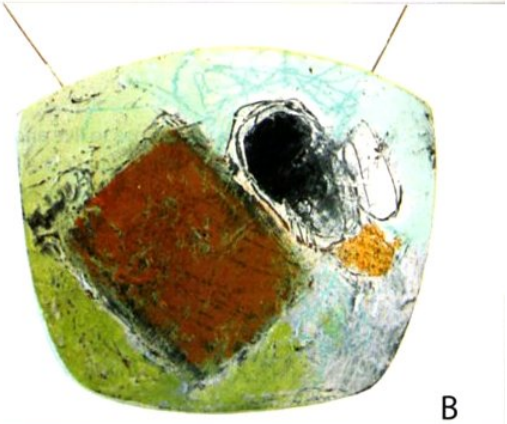
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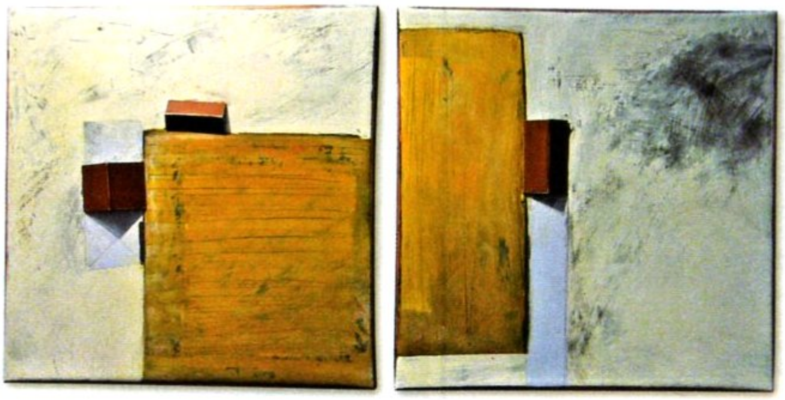
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interested in where we choose to live and why — city versus suburban versus rural — that what's the work was about then. It's still what the work is about, but it's not so direct as it was.

I also had a child two years ago. The things I notice are different. And his drawings, and his Cheerios sitting on his high chair — it's amazing, these circular patterns have just developed!

We purchased a mid-century modern home about four years ago, and we've redone it ourselves. It's full of mid-century modern furniture, and these lines of furniture show up. I started growing succulents, and you can look back and see these leaf forms and these angled shapes. I collect antique globes, and I've always been interested in mapping. I think that's the common thread; it's always something I'm collecting or observing.

When you make a piece, do you start with the imagery?
I keep my digital camera with me all the time. So I might be driving down the road and see mudflaps on the back of a truck with this swished pattern, or I'm in my garden and see something growing. I never work directly from images, but I go back and I look at the images, and I think, 'Oh, wow, it was *way* more beautiful in my head!' And it gives me a starting point.

I start by cutting out the metal and fabricating the pieces, so the painting is the last process that happens. I was making wall pieces and objects for quite some time. People considered me a painter, but for me they were about the metal; they were about the scratching and scraping, and you could see through the layers and surfaces to the metal, and then that evolved into jewelry.

Do you know what prompted that evolution?
For a long time, I was interested in the landscape and the horizon line. I was doing retail shows, and driving to shows throughout the country all year long, so I was in my car and listening to music or Books on Tape for hours on end. So I was able to see these vistas, and that was driving the wall pieces. I have been doing fewer retail shows, spending more time gardening, recycling, composting, whatever it may be here at home now, so that's been the dialog for the jewelry.

It's sort of a narrowing of scale of the landscape you occupy.
It is! Literally, it's narrowing the focus to where I am right now.

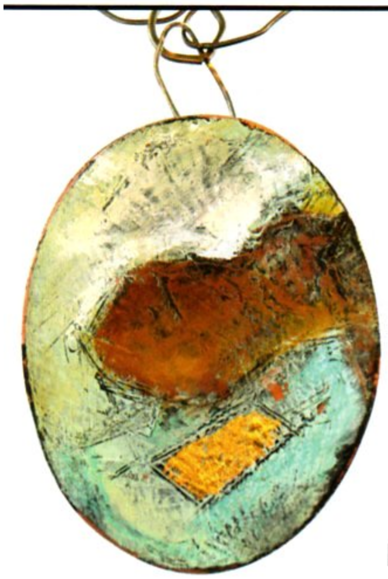
You mentioned that your son's own artwork is feeding yours.
I think lots of artists enjoy their children's drawings. When I see children's drawings of people and animals, the proportions have something that is so innocent. I look forward to his drawings becoming more evolved, right now they are just shapes.

In my work, there's a lot of layers of paint on each piece. Sometimes I've let [my son] take a pencil on the wet paint and see what happens. Then I go back in and gold leaf certain areas. There's something I wouldn't have done before he arrived!

How many layers do you use in a piece?
I start with the metal and then build up. Probably 10–20 layers. I use thin layers — washes, almost — and then I sand through the layers. So the work is about this depth of imagery and texture and kind of life. When I look at the surfaces of my garden, or weeds growing through the pachysandra, or a row of bushes, or farm fields, it's that layer and depth and texture.

Do you ever paint on canvas?
No. I consider myself a metalsmith. I just wanted to color the metal, and paint seemed like a really good option. I love the way the paint sits on the surface of the metal. For me, canvas is bumpy; it doesn't have this sexy feel that you get when you paint on metal. I think of it like riding a bike versus running. It's a completely different thing. For me, it's about the metal. Not more than the paint, but you have to love the metal. A lot of the pieces, if you look at them in person, there's scratching and abrading, and you can see the copper in very fine lines and details on the piece. You *know* that they're metal as soon as you look at them.

[I] *Rust Circle* neckpiece. Copper, acrylic, gold leaf, sterling silver, patina. 2¾ in. (70 mm) high. Photo by Brittani Cole. **[J] *Winter* brooch. Copper, acrylic. 2½ in. (64 mm) high.** Photo by Wilbur Montgomery. **[K] *Orientation* brooch. Copper, acrylic. 3 in. (76 mm) high.** Photo by Wilbur Montgomery.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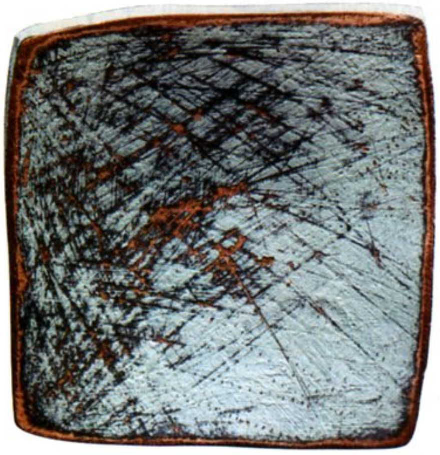
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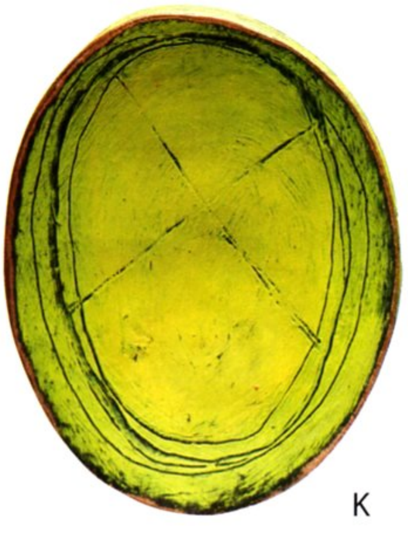
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GALLERY

Art enables us to
find ourselves and
lose ourselves at
the same time.
—Thomas Merton

GALLERY

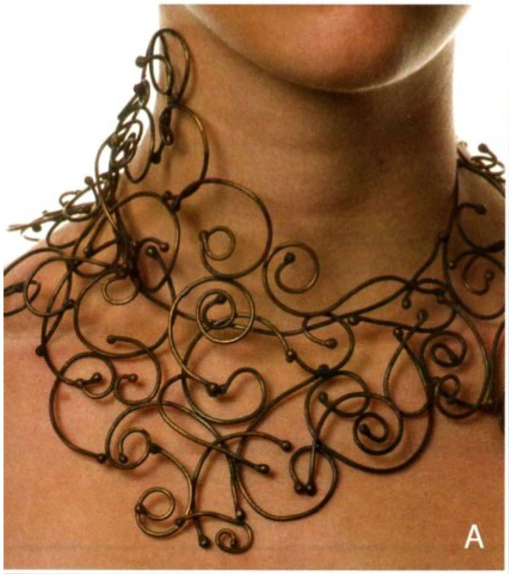
[A] Melissa J. Graff made *Statement Piece* to say that jewelry doesn't have to be small and shiny to be beautiful. "It can be larger and look more aged and still have a wise and elegant quality to it." The 14-gauge (1.6 mm) brass-wire piece is 25.4 x 19 x 12.7 cm (10 x 7½ x 5 in.). Photo by Michael Zawadzki.

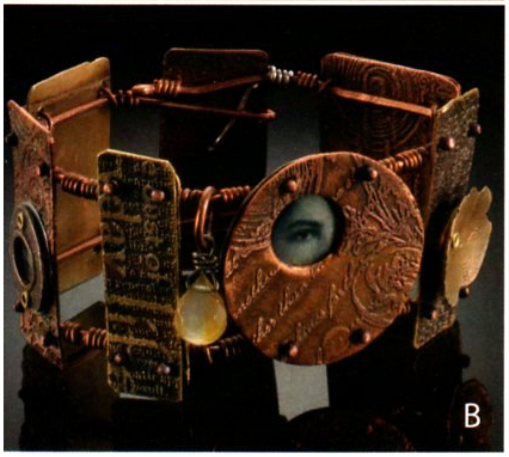
[B] To fabricate her bracelet, Kim O'Neill combined copper, brass, roof flashing, silver, and transparencies. "I like to put a spin on my jewelry by combining old with new — sort of vintage meets modern. I also love the effects of acid etching and the endless possibilities of that technique." Photo by Daniel Fox/ Lumina Studio.

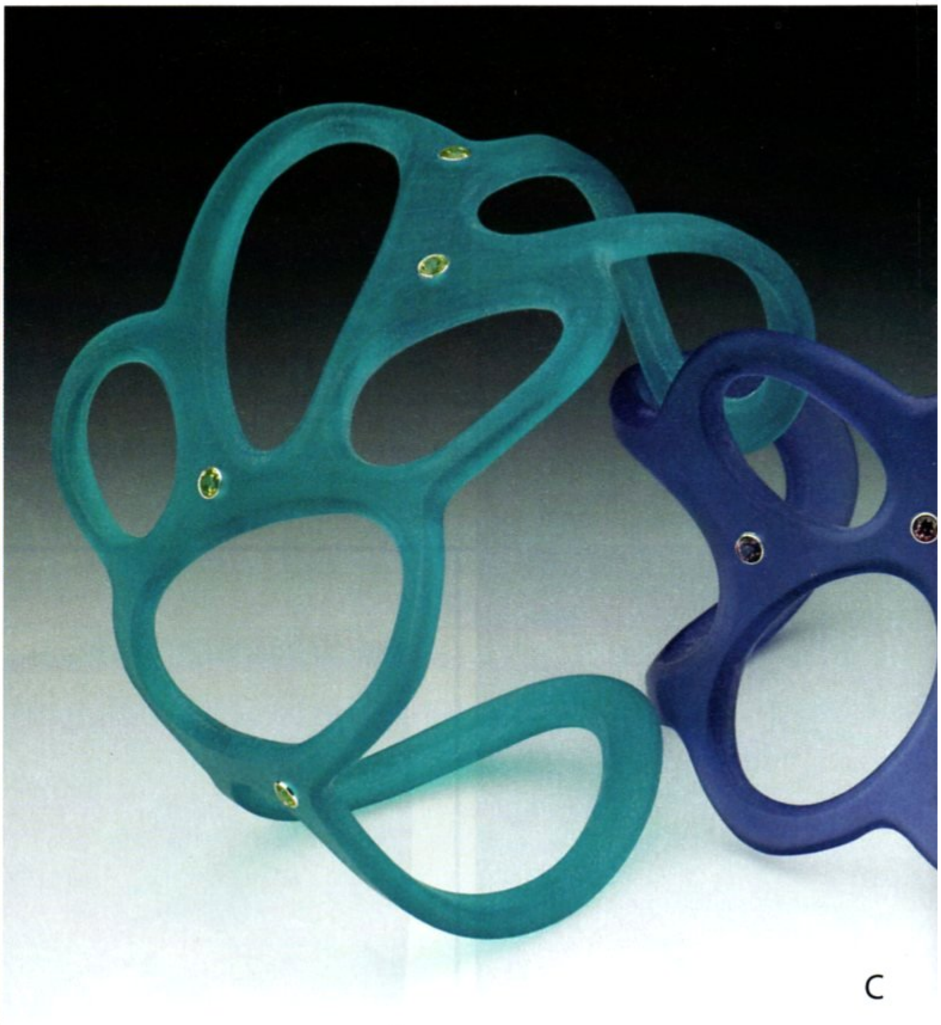
[C] "I choose not to treat the acrylic like a gem," Debra Adelson says of her *Open Flora Cuffs*. "I want it to be its own material, so I don't set it in traditional settings." These pieces are made of acrylic, sterling silver, peridot, and rhodolite. Photo by Peter Groesbeck.

[D] Sarah J.G. Wauzynski used egg tempera on gesso and sterling silver to make her 90 x 90 mm (3½ x 3½-in.) *Saltine* brooch. "With their toasted tips and piercings — I was amused by the idea of utilizing the simplicity of the image for a brooch," she says.

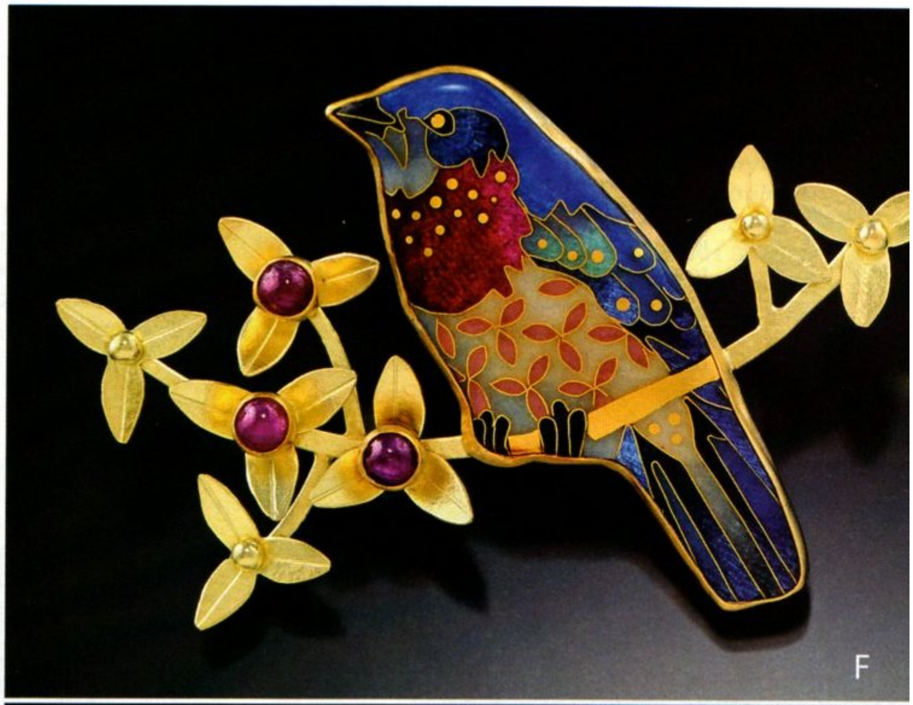
[E] Inspired by Art Nouveau style, Valerie J. Perez of Cavana Design says her *Serpentine Cuff* is all about how line accentuates the body. She fabricated her 3 x 5½-in. (76 x 12.7 cm) piece.







[F] Michael Romanik made *Eastern Bluebird Brooch* of cloisonné enamel; 18k, 22k, and 24k gold; fine and sterling silver; and rubies. 2 x 3 x ¼ in. (51 x 76 x 6.5 mm). Photo by Larry Sanders.
[G] Emerald and tsavorite garnet punctuate silver and 22k gold in Janice Ho's fabricated *Lithops Necklace*. The 18-in. (45.7 cm) piece honors the succulent lithops plant, which resembles small stones. Photo by Larry Sanders.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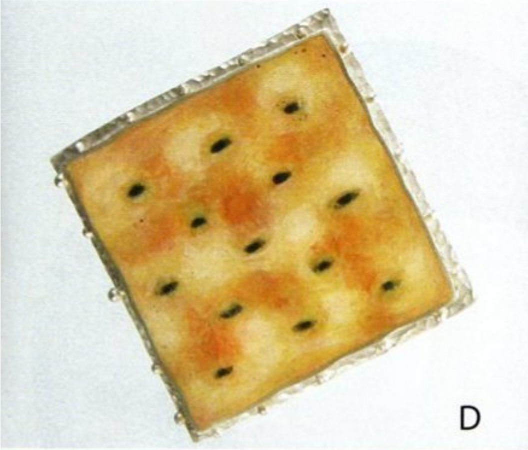
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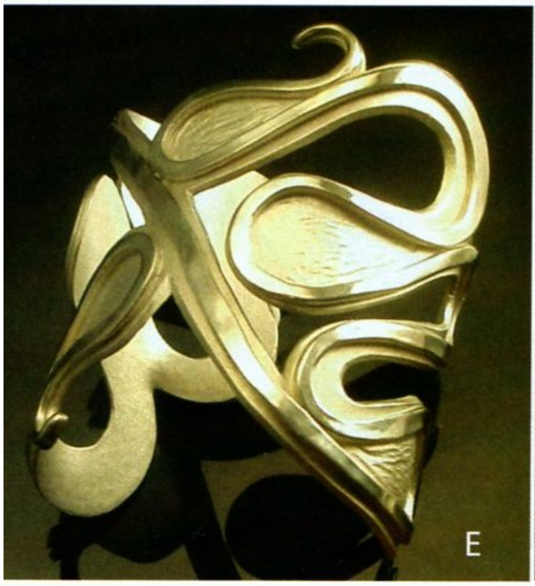
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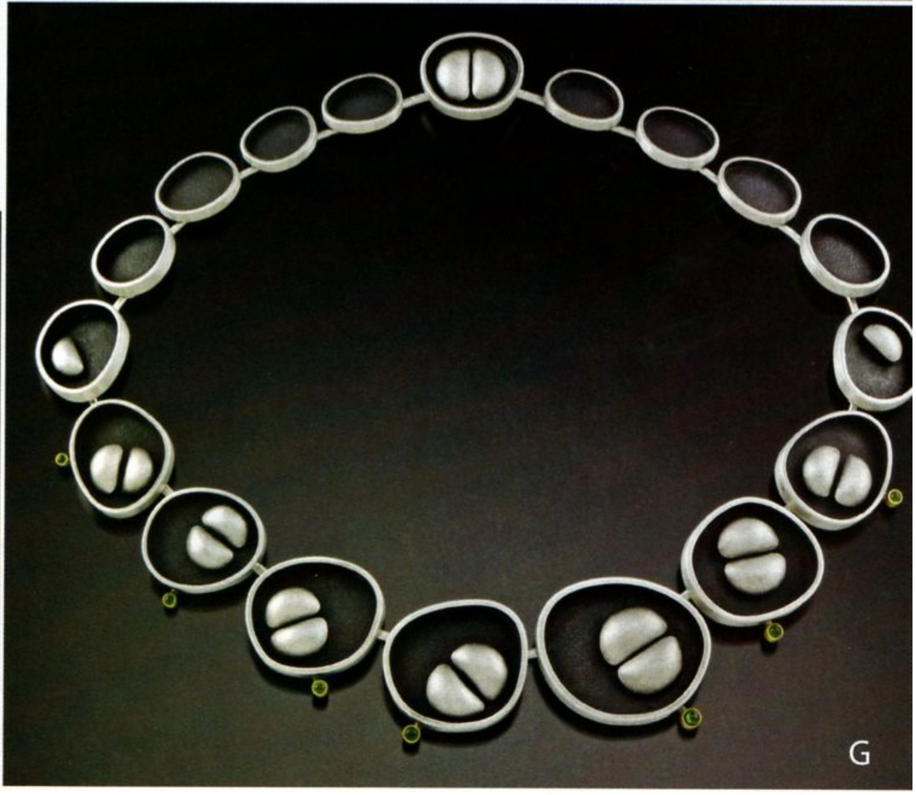
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To contact the featured artists, see Contacts, page 79.

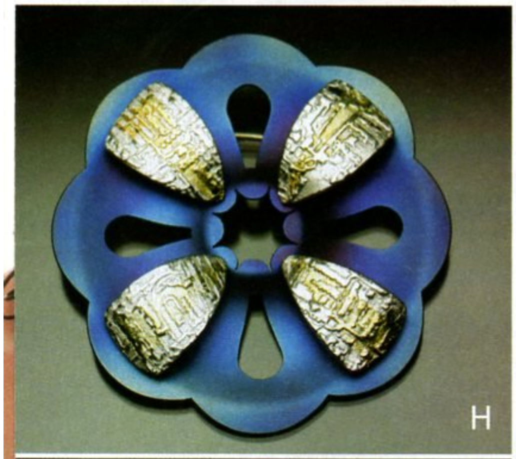
[H] Maggie Bergman combined sandblasted, domed titanium with keum-boo on metal clay to make her *Moreland Rosette* brooch. After she established a new studio in the city, Bergman's previously nature-inspired work transformed. "The old buildings in the city gave me new ideas and led to a whole new body of work." 65 mm (2½ in.). Photo by Abby Johnston.

[I] *Ragnvald*, by John and Corliss Rose of 2Roses, is hand fabricated of sterling silver and steel reclaimed from a very old broken sword. The piece is one in a series that acknowledges their Viking heritage. "The use of forging is a direct connection to the metalworking techniques of our ancestors."

[J] "The materials used in my handcrafted jewelry are all reclaimed from a former existence and bring to the work a history of use and of life," says Gustav Reyes. His *Trefoil Knot* bracelet is made from walnut. 3¼ in. (83 mm).

[K] Michele A. Friedman's *Gerbera Daisy Brooch* was her first major piece to combine wool felt and sterling silver. Gold-plated brass screws add detail. After finishing the piece, she was excited to see where else she could take these materials. 2¾ x 1¾ in. (70 x 44 mm). Photo by Hap Sakwa.

[L] Inspired by a real red, yellow, and blue caterpillar, Céline Charuau used micromosaic techniques to make her *Caterpillar in Battle Gear* brooch from



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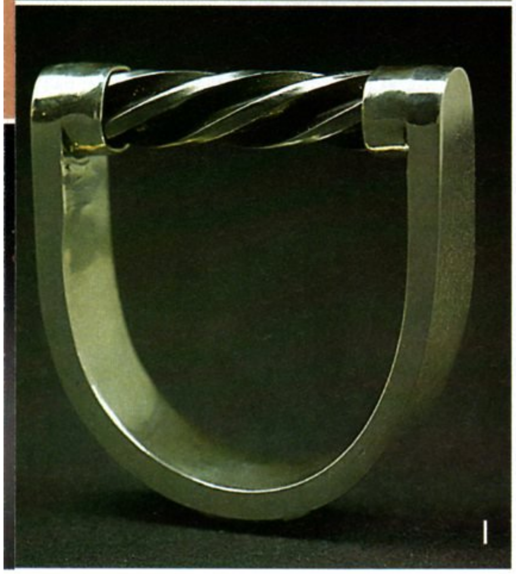

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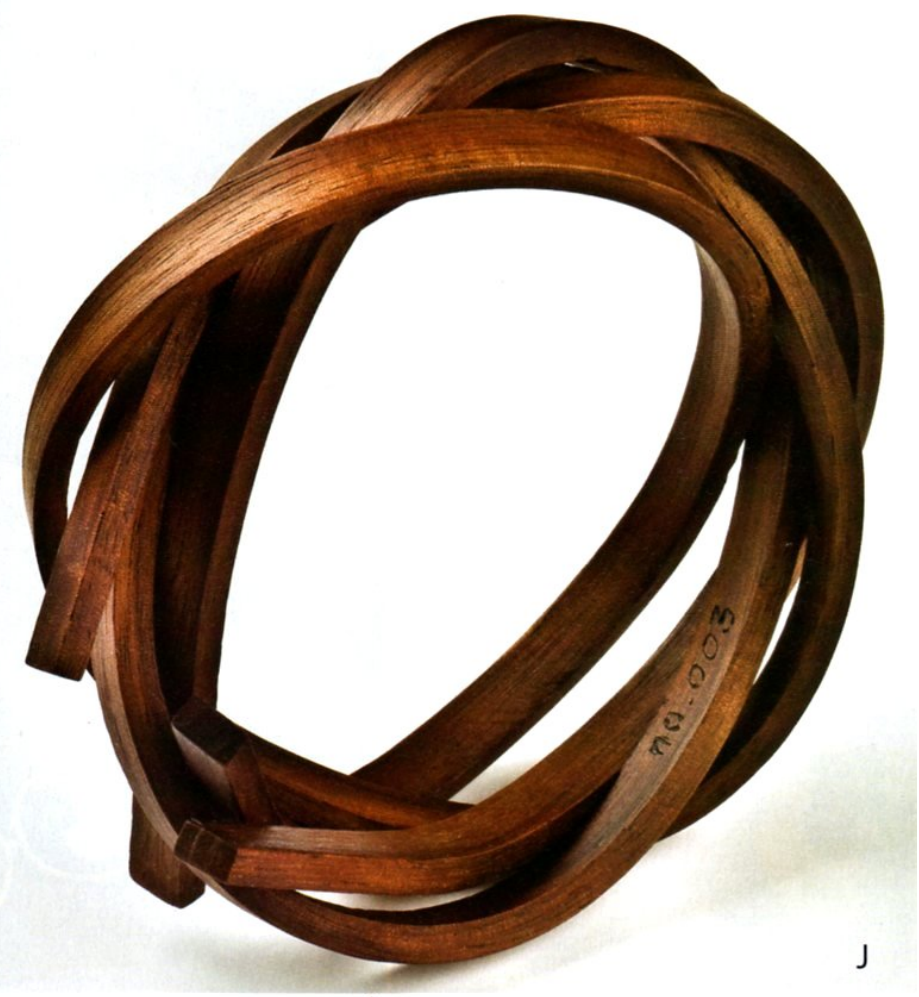
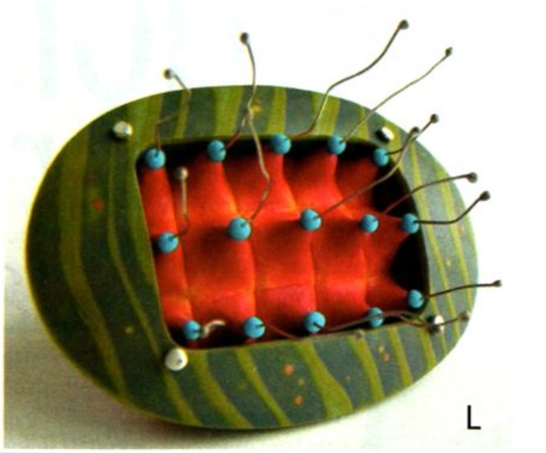


J

polymer and sterling silver. 50 x 70 x 15 mm (2 x 2¾ x 9⁄16 in.).

[M] Sterling silver holds black spinel briolettes and carnelian, black diopside, sunstone, smoky quartz, and peridot cabochons in Lucila Nassau's 18-in. (45.7 cm) *Viewpoints* necklace. She was inspired by opposing opinions. "This clash is represented by the intertwining elements, which, although facing in different directions, end up as a harmonious whole." **AJ**



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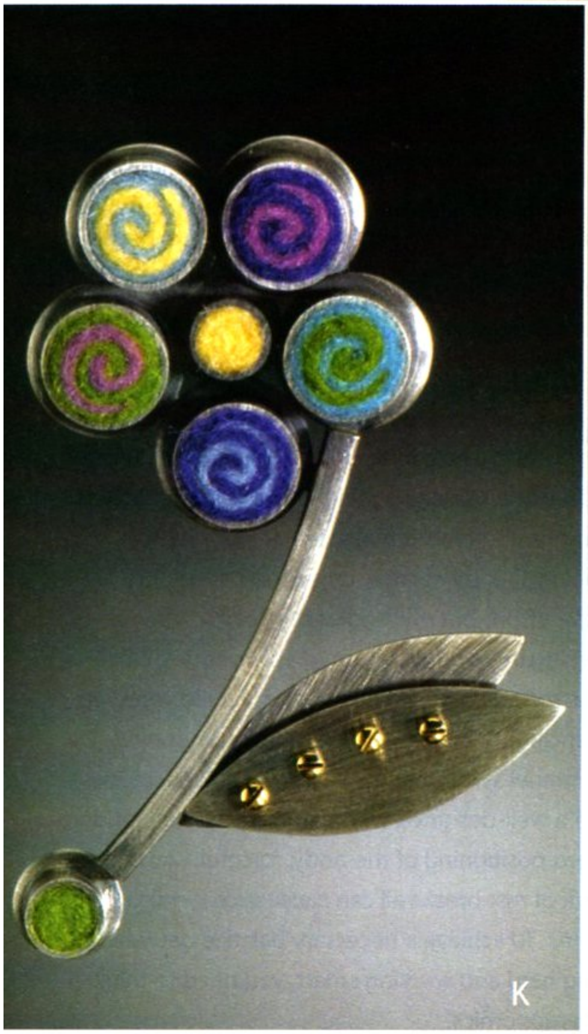

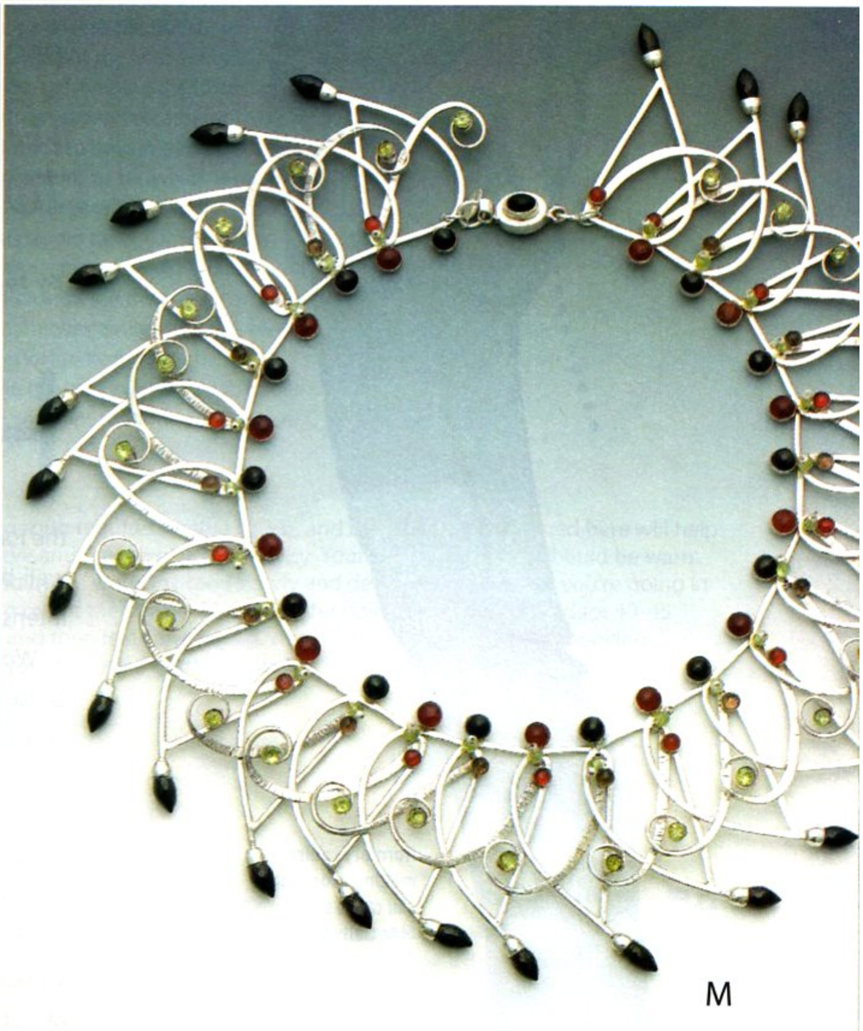

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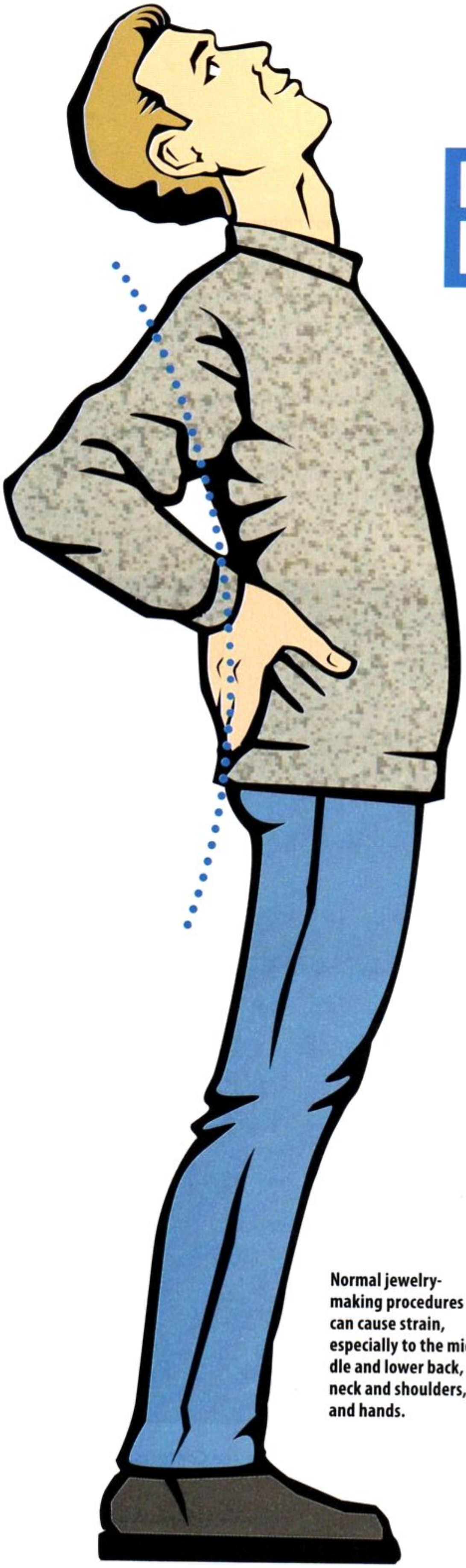
Ergonomics for Jewelry Makers

Whether you create at a jeweler's bench or a kitchen table, we'll show you the healthiest way to work.

by Jean Wilson



Normal jewelry-making procedures can cause strain, especially to the middle and lower back, neck and shoulders, and hands.

How many of us get so involved in the creative process that we forget to stand, stretch, eat, drink, or even blink? Sometimes, work is so enjoyable that we don't recognize the long-term effects it may have on our physical well-being. Our minds may enjoy this prolonged, intensive effort, but our bodies pay for it.

Working in a poorly designed environment can cause assorted musculoskeletal disorders to creep up on us, including muscle strain, arthritis, tendonitis, carpal tunnel syndrome, and even spinal disc injury. Even in a well-designed workplace, repetitive motion, awkward positioning of the body, forceful exertion, and lack of rest breaks all can cause such medical problems. To achieve a necessary balance between working hard and working smart, you need to think about ergonomics.

Ergonomics is the study of making a person's work space fit his or her body so that repetitive work may be done with comfort and efficiency. A properly planned and outfitted work space means a safer, healthier space.

Working posture

Poor posture is one of the most common causes of neck pain and headache. Many jewelry makers hover over their work, bending or hunching forward for long periods of time. If you're doing this, you may be making great pieces of jewelry, but you're also causing long-term muscle strain. The muscles in the back of your neck can shorten and lose their ability to relax, which only compounds the cycle of discomfort.

While working, hold your head as vertically as possible, with your chin jutting outward and not tucked into your neck. This is called the "neutral position" and is also the ideal posture for driving a car.

Chair suitability

The proper chair is key to a user-friendly workstation. Before determining your bench or table height, choose a chair that allows you to sit in the neutral position comfortably. Adjust the height of your work surface to suit your chair; never lower your chair to suit your work surface. Spend the time necessary to find the right chair.

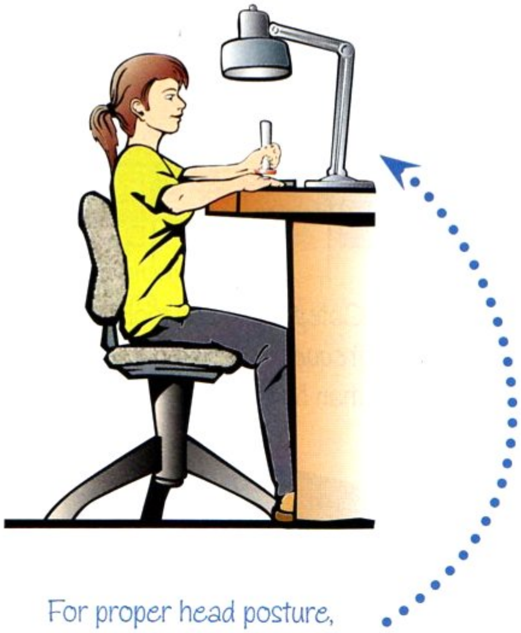
Your chair should be adjustable. Better chairs adjust by seat height, backrest height, backrest tilt, and lumbar support. The chair should provide support to your lower and middle spine. If your chair does not conform to your back, use a cushion designed for lower back support or a rolled towel.

Armrests help prevent middle back strain. If your chair doesn't have armrests, you can buy armrests that slide onto the work surface or have someone handy jury-rig them for you.

There is some debate over seat height. Many experts say that the height of the chair seat should allow one's thighs to be parallel to the floor when both feet are flat on the floor. To check the angle of your thighs, place a pencil across them, just above the knees. If it doesn't roll off, your thighs are parallel to the floor.

Others say that the knees should be slightly elevated, helping the lower spine stay flat; these experts recommend using a small footrest to help attain this position. Try both positions to see which is most comfortable for your body while performing various studio tasks.

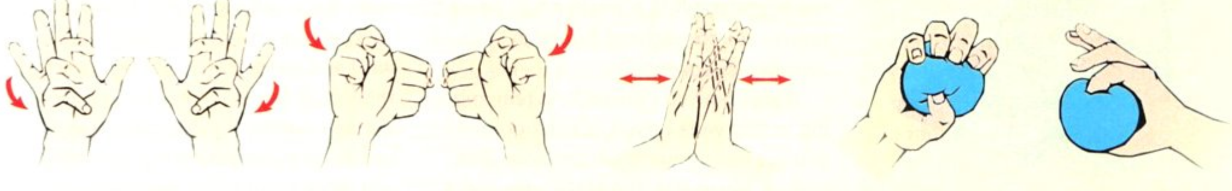
A swivel seat is convenient, but be careful with castors. If the chair is on a hard surface and moves easily, you will expend constant effort to keep your chair from rolling. You may not even notice it, but it will cause constant tension in your spine.

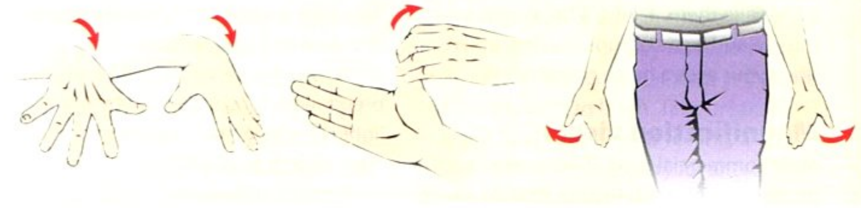


For proper head posture,
remember these three tips:
Keep the chin level,
the back of the neck long,
and the shoulders low.

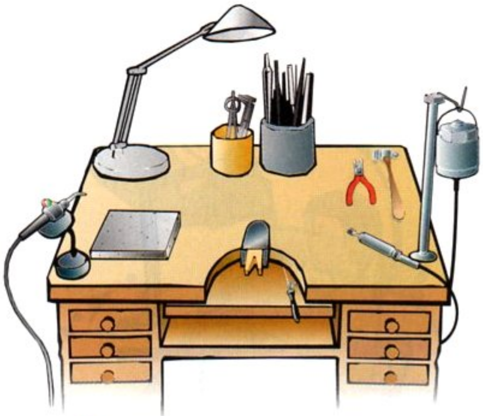
stretch it out

Jewelry making requires nimble hands, and the exercises presented here will help you achieve and preserve hand mobility. Your wrists and hands should be warm before you begin work. Proceed slowly and deliberately, whether you're going in or coming out of the stretch. Stretch to the point of resistance, hold for 10–15 seconds, and then relax and repeat. Avoid jerky movements and bouncing. Listen to your body; if a particular stretch causes pain, don't do it!





online extras
To see a demonstration of these stretches, go to www. artjewelrymag.com/videos.



Categorize your tools by frequency of use, rather than by tool type.

Bench design and height

Jewelry-supply catalogs offer a variety of benches with different features and costs. A bench is a personal choice, but be aware that most of them average about 39 in. (1 m) in height and are not adjustable.

To adapt your bench to your properly adjusted chair, place the chair in front of the bench and sit in the neutral position. For jewelry making, your work surface should be at the center of your breastbone. If the work surface is too high, cut the appropriate length off each bench leg, being careful to be exact. If you're working at a table rather than a jeweler's bench, odds are that your surface is too low. You can raise your work surface by placing risers under each table leg. Bed lifters are handy for this and are available at home-product stores.

Plan to do some work while standing. Standing puts only about half the pressure per square inch on spinal discs as sitting does. Consider having more than one workstation or having a workstation that is easily adjustable.

Tool arrangement and use

Categorize your tools by frequency of use, rather than by tool type. For instance, instead of storing all hammers together, place the most frequently used tools of every variety closest to you and on the side of the workbench where you'd logically pick them up.

For example, a right-handed wireworker would probably place a steel bench block on the left and a hammer used for hardening on the right. You can easily move these tools away after using them, cutting down on bench clutter.

Store tools that you use less frequently farther away from you but still within reach, preferably in a location that doesn't require you to twist and extend in awkward directions.

If you think you'll need help remembering to take work breaks, place tools that you use less frequently in positions that require you to stand and take a few steps to retrieve them. Taking a break gets your muscle and bone groups moving, and it gives your eyes a much needed rest.

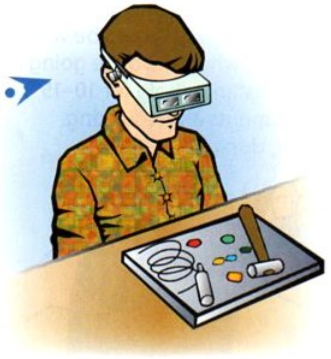
Magnification visors

Most commercial magnifiers available to jewelers require you to look straight ahead through the lens or magnifying plate. If your work is lower than eye level, your head must be bent downward, creating undue stress on your neck. If the visor is adjustable in the up-and-down position, try using it in the lowest possible position, as if you're looking through a bifocal lens.

If you'd like to speak to or look at someone, avoid lifting your chin and hyperextending your neck to look under the lens at the speaker; instead, move the visor out of the way.

Binocular loupes are another option. The ones that medical professionals use can be quite expensive, but inexpensive ones are available as clip-ons that hang below regular prescription glasses and are used like bifocals.

When it comes to lens magnification, don't assume stronger is better. The stronger the lens, the closer to your work you'll need to be in order to see through the lens correctly. Use a lens magnification that is suitable for your needs. Proper bench or table height is critical to the use of magnifiers in preventing strain on the neck.



If your work is below eye level, your head bends downward, creating undue stress on your neck.

Hand ergonomics

Repetitive Strain Injury (RSI) is a generalized term that describes damage to tendons, nerves, muscles, and other soft body tissues caused by performing the same motion over and over.

Carpal tunnel syndrome is a common RSI in those who work with their hands. Muscles and tendons that pass through the carpal tunnel in the wrist become swollen and press on the nerve that also goes through that area, causing impingement pain. This "pinched nerve" pain can also occur if wrists or hands are rested on sharply defined areas, such as a table edge, or if elbows are rested on a hard surface.

There are several ways to help prevent wrist and hand injuries. For one example, think of athletes — they always warm up before exertion. A basketball player that passes up the warm-up jog and stretch will shock his or her muscles when the full-court sprint begins, usually resulting in pulled and painful muscles.

Warm up your wrists and hands in preparation for studio work by practicing light stretching and strength exercises (see "Stretch it Out," *page 47*).

Athletes also alternate types of training;

spine mechanics

Consider your body a working machine, and think of ways to use it in order to prevent injury to your spine. For example:

- When you're lifting an object, bend at the knees and hold the weight as close to your body as possible. Lift the object with your leg muscles, not your back.
- Avoid uncomfortable neck angles, such as hyperextending your neck for sustained periods of time. Position your work surface high enough to keep your neck in a neutral position.
- If one of your legs is longer than the other, place a lift in the shoe of your shorter leg. Your spine works to hold your body straight, and you'll eliminate stress if your legs are the exact same length.
- Maintain a healthy, upright posture that promotes the natural curve of your spine. Adjust all other variables around that position. Don't hunch over your work, and invest in a quality chair.

for example, they'll do aerobics one day and weightlifting the next. When possible, plan your studio tasks in the same manner. Avoid repetitive high-vibration motions, such as heavy hammering, for long periods of time. Taking frequent rest breaks and alternating tasks will help provide enough rest to the affected joints and tissues. When you take a break, stretch out your hands again.

As with the spine, the ideal resting position for the hands is called "neutral." It is a straight line down the forearms, wrists, and hands. Try to maintain a neutral position while sleeping. Don't sleep on your wrists and hands by using them as a pillow or as a wedge between your knees. Avoid sleeping with your wrists and elbows sharply bent or using an elbow for a pillow.

The right tools

Investing in good tools will pay off in the long run. Buy tools that are well made, designed for specific applications, and the right size for you and whatever task you're doing. This will avoid stress on your body caused by applying excess force and assuming awkward positions. It is especially important to have the right tool for high-frequency tasks.

Maintaining tools in their best working order will save you time, effort, and money. Keep the tools clean and dry in order to avoid rust. Also, keep them sharp and oiled, if required. Replace worn-out consumable items, such as saw blades, as soon as they show excess wear.

Exercise, rest breaks, and therapy

When a dentist was asked for the most important advice he could give to students ready to graduate from dental school, he answered, "Get in shape and stay in shape! You will be spending endless hours in the same position, leaning over your work, and it's really hard on the neck and back." The same is true of jewelry makers.

Set a timer as a reminder to stop working and take a break. Ideally, these breaks should be every 20–30 minutes and should encompass a variety of activities, including stretching and drinking water.

Make stretches and exercises for the hands, neck, and back part of this routine. Regardless of your schedule and work load, a daily program of stretching and exercise is the most important thing you can do to maintain your skeletal and muscular systems.

Beyond basic fitness, other opportunities for pain relief include going to a massage therapist, chiropractor, or physical therapist. A physical therapist might also be helpful in assisting with your studio planning or revision.

Practice a healthy working posture, spring for a good-quality chair, arrange your tools and workbench comfortably, and most importantly, pay attention to your body. It speaks louder than you think if you really start to listen. Take breaks to evaluate how your body is feeling, and adjust yourself as necessary for short-term relief and lifelong health. AJ

Set a timer as a reminder to take a break every 20-30 minutes, and don't forget to keep hydrated.

you may also like

If you're thinking about upgrading from your kitchen table to a jeweler's bench, check out "Buyers Guide: Jewelers' Benches" (July 2007). If you don't have the issue, you can buy it online at www.artjewelrymag.com or by calling our Customer Service department at 800.533.6644. Subscribers can download a free PDF of the article at www.artjewelrymag.com/projects.

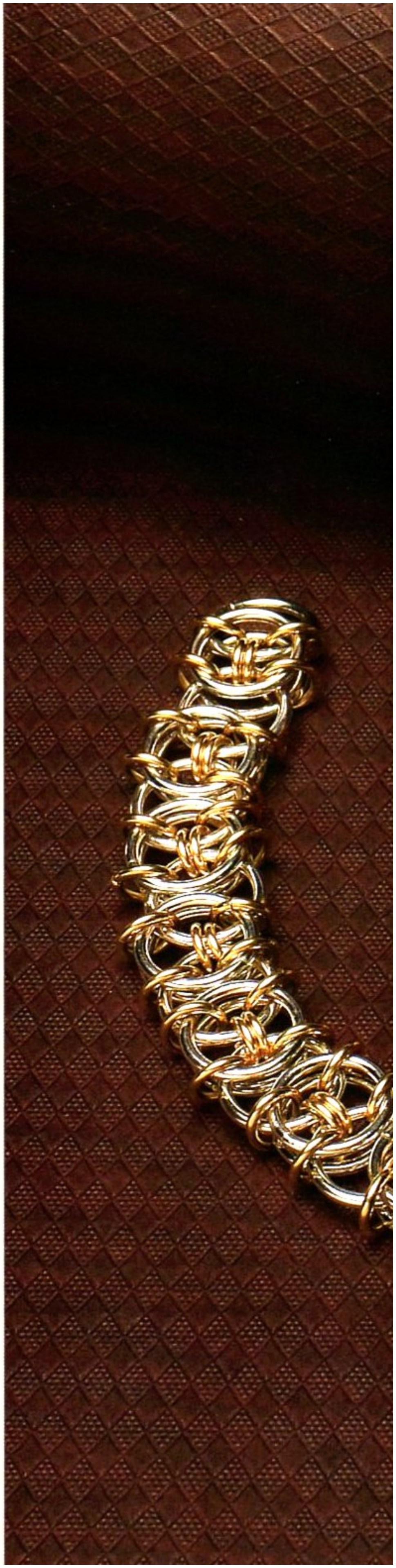
2 Metals 2 Chain mail Patterns

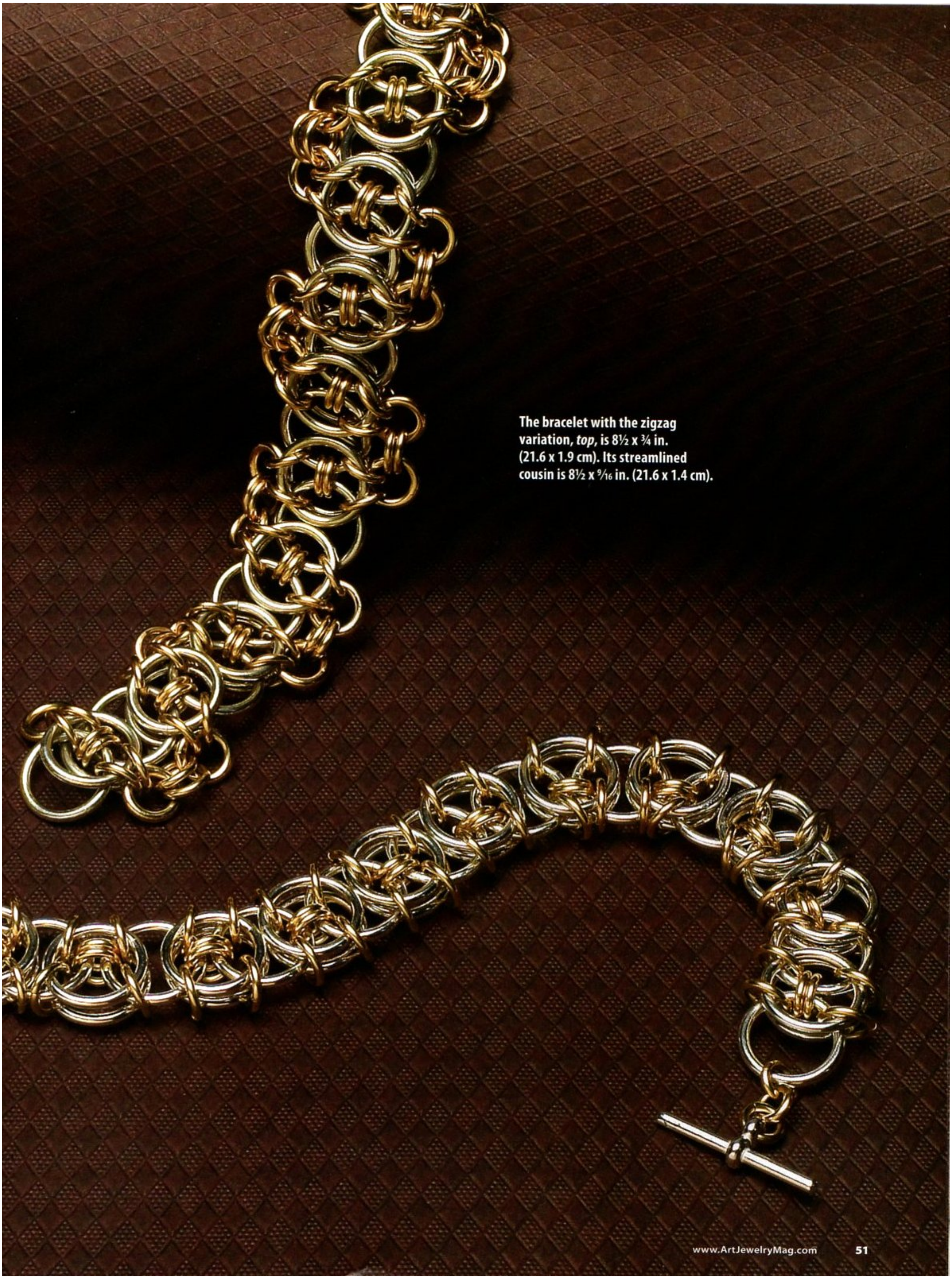
Make a streamlined flat-weave bracelet (gold-filled zigzag optional).

by John Fetvedt

A deceptively simple chain mail pattern forms the backbone for a zigzag variation. By using contrasting silver and gold-filled jump rings, you'll draw attention to the interwoven zigzag and give the basic flat bracelet added dimension.

For the understated look of the basic pattern, stop after part 1 and add a clasp to your chain. For the zigzag treatment, follow the steps in part 2.





The bracelet with the zigzag variation, *top*, is 8½ x ¾ in. (21.6 x 1.9 cm). Its streamlined cousin is 8½ x 9/16 in. (21.6 x 1.4 cm).

materials

Basic Celtic Visions pattern

- Sterling silver or Argentium sterling silver jump rings:
  - Large: 16-gauge (1.3 mm), 8 mm inside diameter (ID), 52
- Gold-filled jump rings:
  - Spine jump rings: 18-gauge (1.0 mm), 3.2 mm ID, 34
  - Corner jump rings: 18-gauge (1.0 mm), 4 mm ID, 68
  - Small jump rings: 18-gauge (1.0 mm), 3 mm ID, 3
- 18 mm sterling silver toggle

Zigzag variation (materials above plus)

- Gold-filled jump rings:
  - Spine jump rings: 18-gauge (1.0 mm), 3.2 mm ID, 32
  - Zigzag jump rings: 16-gauge (1.3 mm), 4 mm ID, 34

toolbox, *page 76*

- Chain mail

Find out where to buy supplies, *page 79*
See Safety Basics, *page 76*

Videos & Basics

Check out these bonus tutorials for fundamental techniques used in this project:

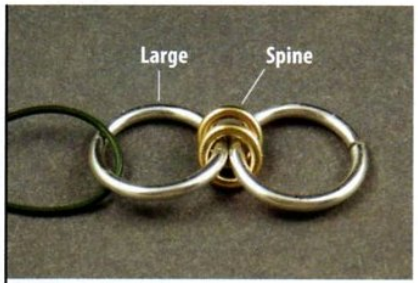
- Opening and closing a jump ring B ▣
- Fusing jump rings B ▣

B Basics, ***page 73***
▣ Videos, www.artjewelrymag.com/videos

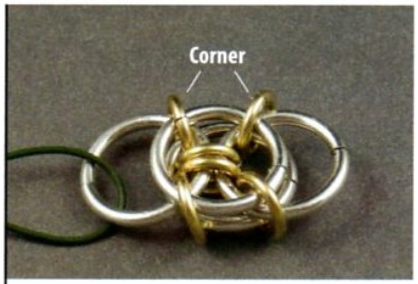
Quick tip

Whether you're making the basic chain mail pattern or the zigzag variation, begin by using two pairs of flatnose or chainnose pliers to close all of the 8 mm-inside-diameter, 16-gauge (1.3 mm) jump rings B ▣. For a sturdier bracelet, see "Make Your Chain Stronger," *opposite.*

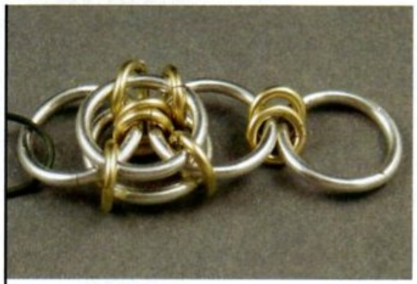
Part 1: Basic Celtic Visions pattern



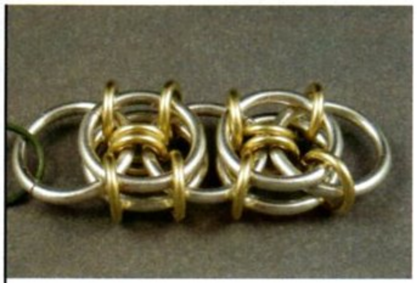
[1] Twist a piece of scrap wire through an 8 mm (large) jump ring. Use two 3.2 mm (spine) jump rings to attach this large ring and a second large ring.



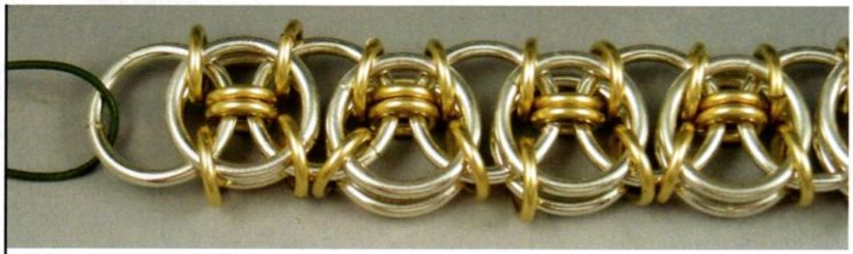
[2] Sandwich the spine rings between two large jump rings. Thread and close four 4 mm (corner) jump rings through the sandwich as shown.



[3] Use two spine rings to connect another large ring to the end of the chain.



[4] Repeat step 2.



[5] Continue the pattern to complete a chain to your desired length.

Optional: At one end of the chain, add a 1+1+1 series of 3 mm jump rings, and attach the toggle half of a clasp. The large ring at the opposite end of the chain serves as the other half of the clasp.

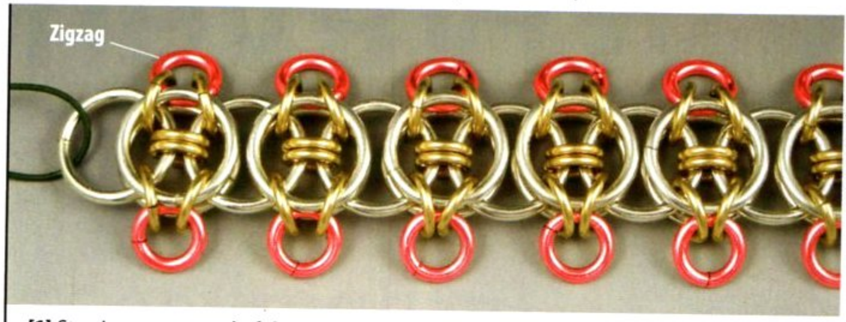
online extra

You may also like John Fetvedt's "Tapered Byzantine Earrings" and "Half-Byzantine Hoop Earrings" projects, which are available exclusively online to subscribers. Visit www.artjewelrymag.com/projects to download these free projects.

Half-Byzantine
HOOP
Earrings
Tapered
Byzantine
Earrings

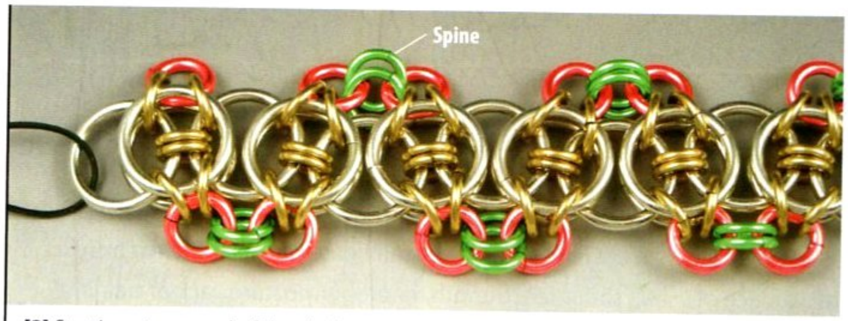
Part 2: Zigzag variation

To make this variation, you'll build on the chain you made in part 1.



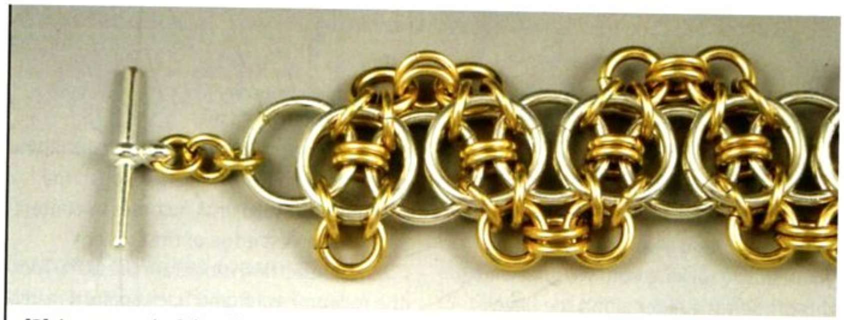
Process photos by John Fetvedt.

[1] Starting at one end of the chain, use a 4 mm (zigzag) jump ring to connect each pair of corner jump rings.



[2] Starting at one end of the chain, use two spine rings to connect two adjacent zigzag rings. Alternating sides of the chain, continue to connect all the remaining adjacent zigzag rings.

NOTE: You'll have a lone zigzag ring at each end of your chain.



[3] At one end of the chain, add a 1+1+1 series of 3 mm jump rings, and attach the toggle half of a clasp. The large ring at the opposite end of the chain serves as the other half of the clasp. AJ

make your chain stronger

To make this chain mail design more durable, you can fuse or solder the 8 mm jump rings before you begin building the chain.

You can fuse jump rings made of Argentium sterling or fine silver. Argentium sterling silver is an alloy that contains a small amount of germanium, which makes the alloy resistant to firescale. Because of this, Argentium silver is easier to fuse B ▣ than traditional sterling silver.

Fusing setup for Argentium sterling silver or fine-silver jump rings:

- **Handheld butane torch**
- **Fire-resistant surface (soldering pad, firebrick, or charcoal block)**
- **Flux**
- **Tweezers**

You'll need to solder jump rings made of traditional sterling silver.

Soldering setup for sterling silver jump rings:

- **Torch**
- **Fire-resistant surface (soldering pad, firebrick, or charcoal block)**
- **Hard solder**
- **Flux**
- **Tweezers**
- **Pickle pot with pickle**
- **Copper tongs**

Prevent with Improved Bezel-roller Techniques

Learn how to use this often misused and misunderstood tool to set your stones securely.

by Donald C. Dietz

A poorly set bezel can destroy the look and value of an otherwise beautiful handmade piece of jewelry. Telltale signs of a badly set bezel: a stone that's loose in its seat; bezel walls with rough, uneven edges; and folds or crinkles in the bezel wire. These may seem like amateur mistakes, but they can affect some professional jewelers too. Poorly set bezels could be the result of poorly chosen bezel wire, insufficient arm/shoulder strength, improper posture, lack of training on the correct use of the bezel-setting tool, or even a deficiency of the stone. But by learning how to hold the bezel roller correctly and using the proper body muscles, you can overcome most of these problems to consistently set stones securely.

How to use a bezel roller

These instructions assume a basic understanding of the steps required to set a cabochon in a bezel B 🎥. But for an overview of the process and tips, see "Summary: Bezel Methodology," *page 57.*

Grip and position

Grip the bezel roller. Hold the bezel roller as if you were holding an ice pick, ready to make a chopping motion. Grip the handle, and position your hand palm up. Keep the heel of your hand in contact with the bench pin as much as possible to avoid slipping **[1]**.

Hold your elbow to your rib cage, and lean your shoulder slightly forward. In this position, you use your shoulder instead of hand strength to push the bezel.

Practice the motion. Cock your wrist back, holding it at an angle as far as is comfortable. Touch the edge of the roller to the bezel, and push with your shoulder while slowly rocking your wrist forward; this propels the roller along the bezel, pushing the wire against the stone.

Because you're keeping the heel of your hand in contact with the bench pin, the roller is less likely to slip off the bezel wire and mar your stone.

First setting movement

There are two distinct operations to setting a bezel. The first is moving the bezel inward, securing it against the bottom edge and sides of the stone. The second tightens the top edge of the wire.

Push the base of the bezel wire. Holding the bezel roller at a low angle, push the bezel wire inward until it comes in contact with the lowest edge of the stone.

While exerting moderate pressure, rock the roller forward (and back again, if necessary) one roller-length. Rotate the bezel, and push the bezel wire on the opposite side to hold the stone in place. Secure the two remaining sides, then work around the bezel wire **[2]** one roller-length at a time, repositioning the bezel as you work.

NOTE: Remember, push the tightest parts of the bezel first.

Push the top of the bezel wire. After going around the stone once at a low

Wiggly Stones

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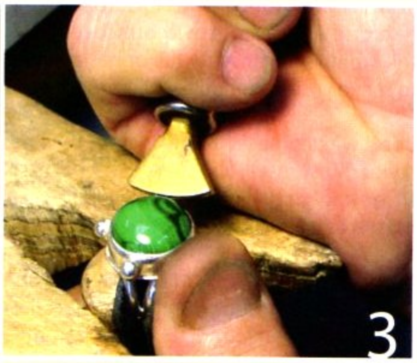
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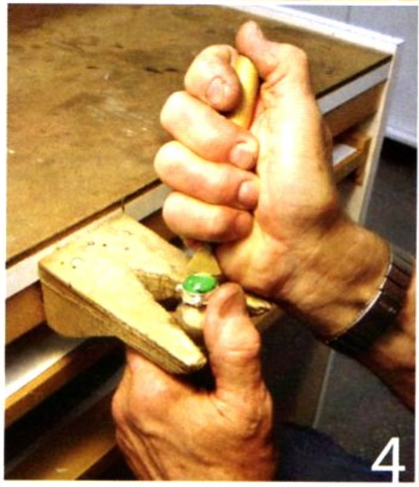
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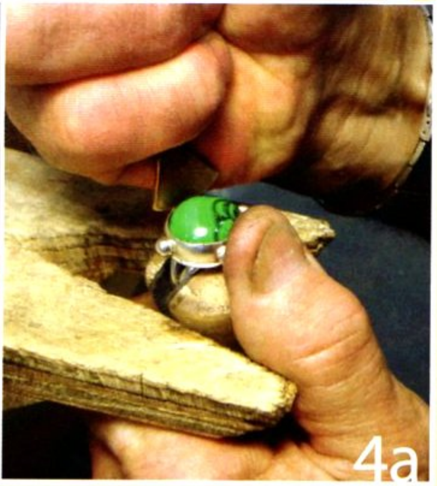

4a

Process photos by Tara Huber.

materials

- Cabochon stone to set
- Bezel wire (see "Which Bezel Wire to Use?" *page 57*)

toolbox, *page 76*

- Stone setting

additional tools & supplies

- Bezel roller
- Grinding machine with abrasive wheel (optional)

Find out where to buy supplies, *page 79*
See Safety Basics, *page 76*

angle, increase the angle slightly to match your stone's curvature **[3]**, and work your way around the top portion of the bezel.

Second setting movement

When you've fully secured the bezel so that it's well-formed and lying flat against the surface of the stone, it is time to secure the top edge of the bezel, called "seating the stone."

Seat the stone. Position the bezel roller perpendicular (or nearly so) to the curved surface of the stone, and set the roller's working face on the outside corner of the bezel wire. Simply rock the roller back and forth with gentle pressure to push the wire down against the stone. Reposition the bezel and move the roller forward one length of the roller at a time **[4 and 4a]**.

NOTE: Rock the bezel roller along the top edge of the bezel wire. Don't use a sliding motion like you would with a burnisher.

When you're working with soft metals, such as fine silver or 18k gold, this vertical pressure will slightly flatten the top edge of the wire and push it over, setting it perfectly to the stone's surface. This leaves a narrow flat facet all around the bezel where it meets the stone, creating a nice, finished look. With practice, you can achieve this look by using just the bezel roller, rather than by using a burnisher or graver and by filing or sanding.

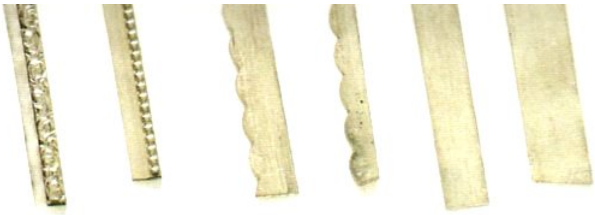
Videos & Basics

Check out this bonus tutorial for fundamental techniques used in this project:

- Making a bezel cup and bezel-setting a stone B ▣

B Basics, *page 73*
▣ Videos, www.artjewelrymag .com/videos

make your own bezel roller!
See "A Good Bezel roller is Hard to Find — So Make Your Own!" *page 58*.



What is a bezel?

A bezel is a narrow strip of metal that encompasses the circumference of a stone, securely holding it in place. Normally, the bezel wire is fairly short; to grip the stone securely, the wire needs to be tall enough to extend just beyond the point at which the stone curves inward (called the "girdle"). The goal is to display the stone without covering up too much of it. If the stone is particularly tall or has a thick girdle, you may need to make your bezel quite tall to reach up and over the girdle.

Bezel wire comes in many metals, thicknesses, widths, and styles. Most metal suppliers carry bezels in fine silver, sterling silver, and gold alloys, but copper, nickel silver, brass, and other metals can also be used for bezels.

Bezel wire is generally thin and soft so that you can easily manipulate it around your stone. Bezel wire heights (the width of the wire) from 3 mm (⅛ in.) to 10 mm (⅜ in.) are commonly available in both fine and sterling silver.

The average thickness of bezel wire ranges from 26 gauge (0.4 mm) to 30 gauge (0.26 mm). Because sterling silver work-hardens, it's difficult to use in thicker gauges; anything heavier than 26 gauge (0.4 mm) requires special setting techniques. Since fine silver is softer than sterling silver, you can use the method described in "How to Use a Bezel roller," *page 54*, with fine-silver bezels as thick as 22 gauge (0.6 mm).

Bezel wires, *above*, may be plain, shaped, or highly imprinted with designs (also known as "gallery wire"). Some, called a "step bezel," *right*, have a double-thick base that creates a small shelf inside the formed bezel; the girdle of the stone will sit on this shelf. You can use stepped bezel wire to create an open-back bezel without a supporting backplate.

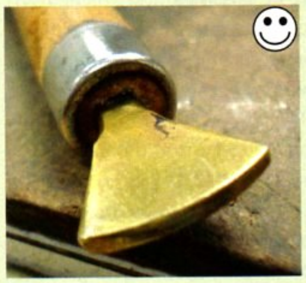
you may also like

To learn more about step bezels, check out "Take the Next Step in Making Bezels" (May 2008). You can purchase the article at www.artjewelrymag.com/projects.

How to select your bezel roller

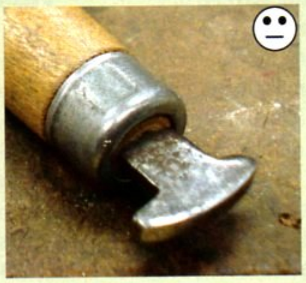
There are two main types of bezel-setting tools: bezel pushers and bezel rollers. Bezel pushers are designed to press one small static section of bezel against the stone at a time; bezel rollers are better suited to fluid movements that push larger sections of bezel against the stone in a sort of rolling movement. I prefer to use a bezel roller whenever I set a stone; the curve of the working face of the tool allows me to push the bezel smoothly against the stone and create fewer marks or wrinkles in the bezel.

Here are some examples of bezel rollers:



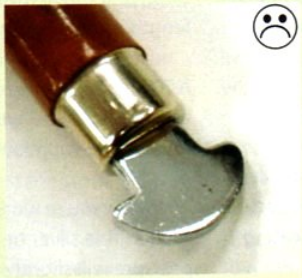
☺

This is my favorite bezel roller. It's handmade of brass, a metal that's softer than steel and, therefore, less likely to mar your bezel. It has a rather gentle arc (about 15 mm/9/16 in.), and its handle is well suited to my hand.



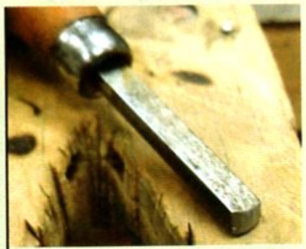
😐

This is a common inexpensive commercial roller. It's a steel roller with a medium arc; it's long enough for most jobs. The handle is a bit short for my large hands, however; it feels a bit clumsy when I'm rolling large bezels.



☹

This is a variation of the second roller with a more severe arc. Its curve is much too severe to use; due to the height of the arc, you can use only a few millimeters of the roller at a time. It also has a short, uncomfortable handle.



This is a prong pusher that I've modified to turn it into a bezel roller. It's useful for setting in tight areas, because it's short and has a narrow curved face.

If you prefer the feel of a bezel pusher's handle but want the effect of a roller, you may want to modify a bezel pusher to work more like a roller.

To make the pusher/roller above, I used an abrasive wheel on a grinding machine to grind the flat end of my pusher into a slightly beveled curve. That way I can still rock my bezel gently into place without creating any dents.

which bezel wire to use?

When selecting bezel wire for a specific stone, consider the shape of the stone and the angle of the cabochon's dome.

Lay the stone on a flat surface, and hold the bezel wire upright against the widest part of the stone. On stones with low or medium domes, the wire should not be more than 2–3 mm above the stone's widest point B. Using wire that is too tall will result in an uneven bezel that covers too much stone.

When you're bezel-setting a cabochon with high, steep, or flat sides, you'll need to select taller bezel wire. The wire must be tall enough to safely hold the stone. If the stone's walls are at a 90° angle, the bezel may even need to extend just over the top edge of the stone.

If the stone's outer edge height varies, select wire tall enough to extend slightly past the highest part of the perimeter. Later, you can cut or file away excess bezel wire along the shorter portions of the stone's perimeter.

If the stone's perimeter includes sharp corners or switchbacks, it is best to use a thinner gauge bezel wire. A thinner wire will allow you to more closely follow the stone's perimeter; heavy wire can be difficult to bend to fit such angles.

A few points to consider when selecting or making a bezel roller:

- *The size of your hand.* The roller's handle needs to fit your hand comfortably; make sure that when you're gripping the handle you can place your thumb over the end of it to keep it from slipping through your hand.
- *The size of the roller.* Sometimes you cannot use a full-sized roller due to space limitations. If you have bezels positioned close together or near some obstruction, it can be difficult to access the lower parts of the bezel wire. You may have to modify an existing roller, *left*, or make a custom roller (see "A Good Bezel roller is Hard to Find — So Make Your Own!" *page 58*) to fit.
- *The roller's shape.* A roller with a severely curved arc may be unable to get into tight areas. For general work, I prefer a roller with a very gentle arc.
- *The roller material.* Most commercial rollers are steel, which is a hard metal that can leave marks. Brass is a much softer metal, so it's less likely to mar your bezel.

NOTE: I don't recommend setting stones with agate bezel rollers. The Moh's hardness of agate is 7 (sometimes 7.5), and it will scratch any stone softer than that. Agate burnishers are great for smoothing metal — just keep them away from your stones.

summary

bezel methodology

No matter what shape your cabochon is, you can follow these five basic steps to set it. To learn more specific techniques, see "How to Use a Bezel roller," *page 54*.

1 **Prepare the bezel.** Before setting a stone, finish the bezel completely; you won't want to sand or file it once the stone is in place. Use files and/or sandpaper to make sure that the top of the bezel is level. The sides should also be smooth and even. Use a pre-polishing compound, such as tripoli, on a buff attachment in a flex shaft to polish the bezel.

NOTE: If the bezel wire is too thick to easily set against the stone, file the top 2–4 mm (5⁄64–5⁄32 in.) of wire into a smooth taper that's approximately half the bezel wire's original thickness.

2 **Secure the bezel for setting.** It's important to properly hold and support the bezel. If possible, embed the jewelry piece in shellac or another holding material, such as thermoplastic Jett Sett compound, on a flat surface.

If you're setting a ring, clamp the ring shank in a ring vise or a GRS BenchMate system. Be sure to position the clamp to support the bezel's base so it will not bend with the pressure of setting. You may have to use some innovation.

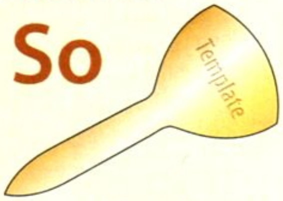
3 **Push the tightest areas of the bezel first.** Using a bezel roller or bezel pusher, first push the tightest parts of the bezel (e.g., sharp corners, points, or narrow ends) against the stone.

As you push bezel wire over a stone, the metal compacts against the stone and work-hardens. If you push over the tighter areas of bezel wire first, any remaining bezel wire will flow into roomier areas, helping you avoid wrinkles.

4 **Push the rest of the bezel.** Once you've pushed the tricky tight points, push around the rest of the bezel. To achieve an even setting, alternate sides as you work. You don't have to push too hard; go around the bezel a few times with a medium-firm pressure to fully secure the bezel.

5 **Refine the bezel edges.** After you've secured the bezel wire against the stone, seat the top edge of the bezel wire against the stone. If you've done everything carefully, you can stop at this point. But, if you discover stray marks you made on your bezel wire, you can carefully file, sand, and polish them away. Just make sure to avoid your stone.

A Good Bezel Roller is Hard to Find – So Make Your Own!



Use basic bench tools to make a stone-setting tool that's custom fit to you.

by Donald C. Dietz

Making a custom bezel roller is simple — it only takes about an hour, and you'll be able to use your custom tool for many years. Instead of using the hard steel that most commercially available tools are made of, I prefer to use brass for my bezel-setting tools. Brass is softer than steel, so it doesn't mar bezels as easily. And I feel that most premade bezel rollers sold today are too narrow; the added width on my roller will help you to set your bezels quickly and with fewer dents in your bezel wire, which will result in a more secure setting.

Determine the shape of your custom roller. Commercially available bezel rollers are about 3.5 mm (about 7 gauge) thick, which is sufficient for most jobs. However, a thicker roller can work better for setting tall bezels.

You may want your roller to have a taller or longer arc than a commercial roller, because with a longer arc you'll be able to make longer rocking movements when you're setting stones, which can allow you to set stones more easily and to make smoother bezels.

For general work, I prefer a roller with a very gentle arc that's about 15 mm long. A longer, more severely curved arc could work well for large stones but would be difficult to get into tight areas. You can always make more than one roller to suit different setting needs.

Sketch out the shape of your desired bezel roller based on your preferences, or use the **Template**, *above*, which is based off of my roller.

Find brass to use for your roller. Using your sketch for reference, find a piece of brass that's at least 3 mm (⅛ in.) thick and large enough that you can cut your roller (including the tang portion) from it, allowing about a ¼-in. (6.5 mm) margin.

I get brass for such projects from local thrift stores. Solid brass trivets, candle holders, etc. will all work and usually cost only a few dollars. The brass star-shaped trivet I'm using **[1]** is 8.5 mm (0 gauge) thick and is perfect for a thicker roller.

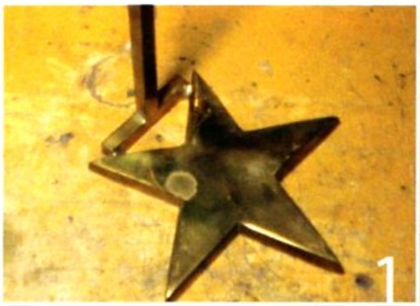
Cut a usable piece of brass. Secure the piece of brass in a bench vise, and cut off a usable portion. In this case, I used a large hacksaw to remove a point about 40 mm (1⁹⁄₁₆ in.) long from the star **[2]**.

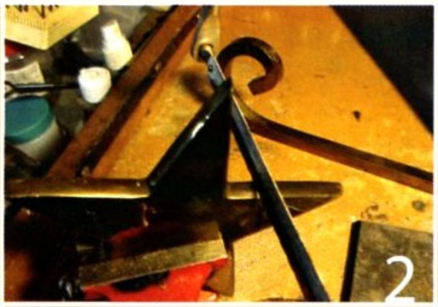
NOTE: To cut the brass, you could use a jeweler's saw or a 1½-in. (38 mm) cut-off disc in a flex shaft instead of the hacksaw.

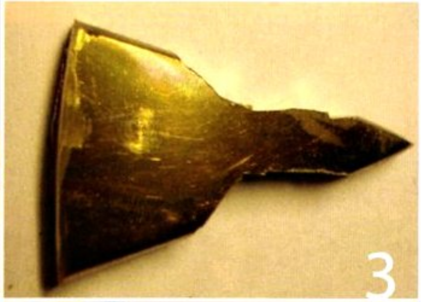
Cut the tang. The tang is the part of the roller that you'll insert into the handle. Using the hacksaw or the cut-off disc, remove excess material, roughing out the general shape of the roller's straight, pointed tang **[3]**.

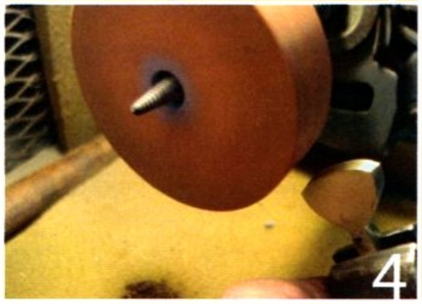
Grind the roller. Secure the roller's tang in a hand vise. Using either a file (this could take awhile) or a grinding wheel on a motorized grinder or polishing machine (much faster) **[4]**, begin to shape the roller.

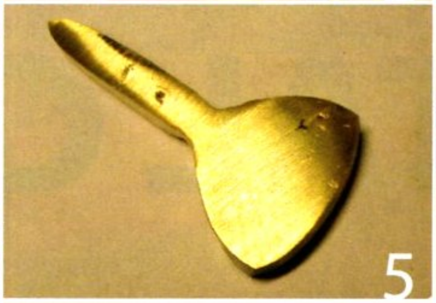
TIP: When you're using a grinding wheel, it's safest and most effective to work on the bottom quarter of the wheel. To avoid accidentally grinding a flat spot on your piece, don't hold it against the wheel in one place for too long; always keep your piece moving.

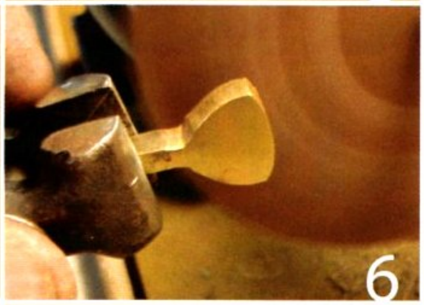


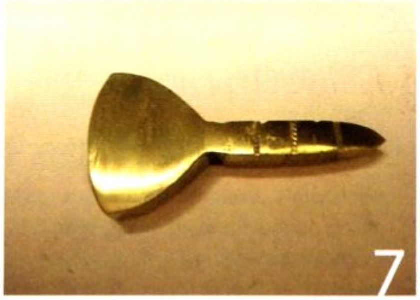


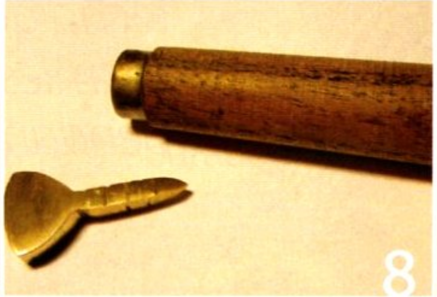


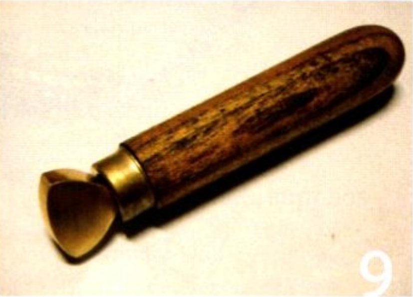












Process photos by Donald C. Dietz.

At this point, you may wish to adjust the length of your tang. I made my tang 1 in. (25.5 mm) long **[5]**. You may want a longer or shorter tang depending on how you intend to use the roller. If you have a longer tang, you don't have to set it all the way into your handle. Leaving space between the handle and the roller's wedge may help you access hard-to-reach areas in a jewelry piece.

Refine the sides of the roller. After you shape the brass, use a sanding wheel to smooth the roller's faces and edges **[6]**.

TIP: I make my own sanding wheels by adhering a sheet of sandpaper to a thick piece of corrugated cardboard.

File grips on the tang. Using the corner edge of a coarse file, file several rough indented rings around all four sides of the roller's tang **[7]**. These file marks will help the tang grip into the handle securely.

Polish the roller (optional). If desired, polish the sides of the roller, but *do not* polish the curved working face. Leave the working face matte so it will be less likely to slip when you're setting a stone. Keep in mind that this is a tool — it will eventually get marked up, so I would not spend additional time polishing it.

Find a handle. For my roller, I used the handle from an old burnisher **[8]**. If you can't find a commercially available tool handle, a 4-in. (10.2 cm) piece of ⅝-in. (16 mm) or ¾-in. (19 mm) hardwood dowel will work. If necessary, use a sanding wheel to shape the handle until it comfortably fits your hand.

Secure the roller in the handle. Select a drill bit that's slightly smaller than the diameter of your roller's tang. Drill a ¼-in. (6.5 mm) deep hole in the tang's handle.

Apply two-part epoxy to the tang, and press it into the handle's drilled hole to secure the tang. Allow the epoxy to dry completely **[9]** before use. AJ

materials

- Brass sheet: 3–9 mm (⅛–⅜ in.) thick (10–00-gauge), 2 x 2 in. (51 x 51 mm)

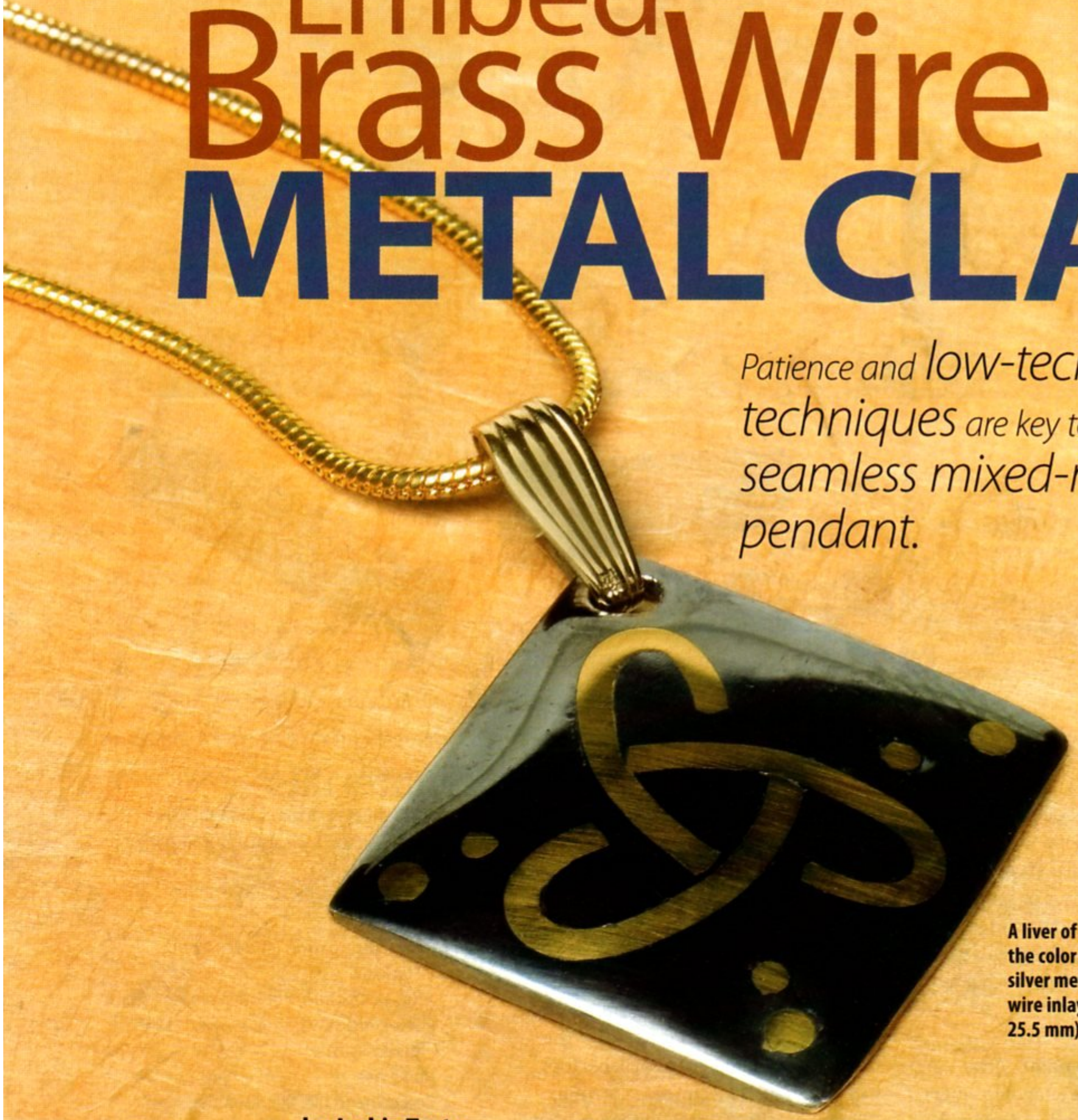
tools & supplies

- Bench vise
- Brass-cutting tools (choose from):
  - Hacksaw
  - 1½-in. (38 mm) cut-off discs, flex shaft
  - Jeweler's saw frame; jeweler's saw blades, size 4
- Hand vise
- Coarse hand file: flat #0-cut
- Silicon carbide grinding wheel (100–300 grit), sanding wheel, grinding/polishing machine
- Handle (choose from):
  - Premade tool handle
  - 4-in. (10.2 cm) hardwood dowel, ⅝–¾-in. (16–19 mm) diameter
- Flex shaft, drill bit to fit tang
- Two-part epoxy

Find out where to buy supplies, *page 79*
See Safety Basics, *page 76*

Embed Brass Wire in METAL CLAY

Patience and low-tech finishing techniques are key to creating a seamless mixed-metal pendant.

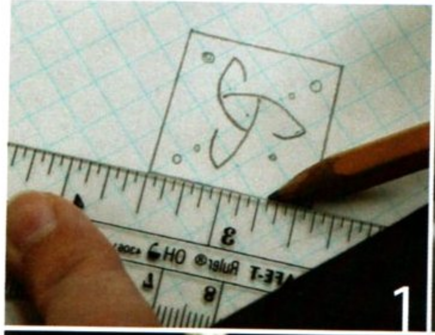


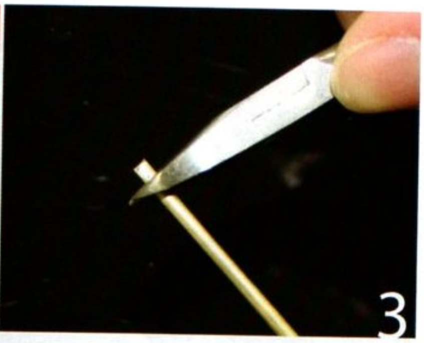
A liver of sulfur patina enhances the color contrast between the silver metal clay and the brass wire inlay in this 1 x 1-in. (25.5 x 25.5 mm) pendant.

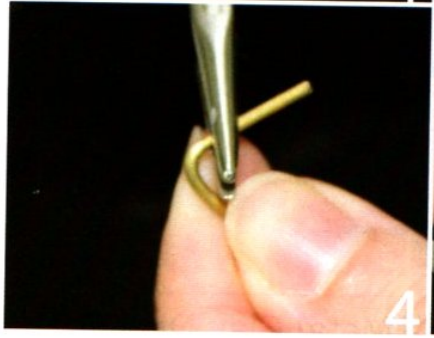
by Jackie Truty

Brass is an economical alloy that has a warm golden color, resists firescale when heated at low temperatures, and is soft enough that you can file and refine it with sandpaper. Together, these qualities make brass wire an excellent material to embed into silver metal clay.

By following my construction tips, you can securely embed brass wire into a silver metal clay pendant. To amplify the color contrast between the wire and metal clay, you'll refine, fire, and patinate the pendant. Careful polishing gives the silver a sheen and color that's reminiscent of hematite.







Part 1: Template and wire preparation

Make a pendant template. Draw a 1-in. (25.5 mm) square on graph paper. Inside the square, draw a simple linear design; keep it centered and at least ⅛ in. (3 mm) from the edges of the square. Cut out the square template.

NOTE: Choose a design that you can easily shape with pieces of wire.

I drew a Celtic triskelion pattern, created with three hook-shaped lines **[1]**. The dots I added will be easy to make by embedding snippets of wire vertically into the clay.

Cut the wire. Use wire cutters to cut a 3-in. (76 mm) piece of 14-gauge (1.6 mm) round brass wire and a 3-in. (76 mm) piece of 12-gauge (2.1 mm) round brass wire.

Anneal the wire. Ramp your kiln to 1470°F (799°C). Place the wires on a kiln shelf, and use tongs to insert the shelf into the kiln **[2]**. After 2 minutes, remove the shelf from the kiln, and allow the wires to air-cool. The wires are now annealed **B** 🎞 and ready for shaping.

NOTE: Do not quench the wires in water; this hardens the metal.

Make wire dots. Using flush cutters, snip ⅛-in. (3 mm) pieces from the wires **[3]**. You'll need as many pieces as there are dots in your design; I snipped three 14-gauge (1.6 mm) pieces and three 12-gauge (2.1 mm) pieces.

Cut the linear wire elements. Using your template as a guide, use flush cutters to cut pieces of wire that are long enough to be shaped into your linear design elements. Use a flat needle file to file the wire ends flush.

Shape the linear wire elements. Use roundnose and chainnose pliers to shape the wires to match your template **[4]**.

File one side of the wires. Place a shaped wire on a rubber block. Using the flat side of a half-round hand file, make a couple of strokes across the surface of the wire to flatten it slightly **[5]**. Repeat to file one side of each of the remaining shaped wires.

NOTE: The side of the wire that you've filed is the side that will face up when you embed the wire in the metal clay.

materials

- Brass wire: round
  - 14-gauge (1.6 mm), 3 in. (76 mm)
  - 12-gauge (2.1 mm), 3 in. (76 mm)
- Metal clay: low-fire formula, 14 g
- Metal clay paste
- Overlay paste
- Bail

toolbox, *page 76*

- Metal clay

additional tools & supplies

- Graph paper
- Wire cutters: flush
- Tongs
- Pliers: roundnose, chainnose
- Hand file: half-round
- 3M sanding pads: fine, superfine, ultrafine, and microfine grits
- Baking soda
- Liver of sulfur
- Silver polish

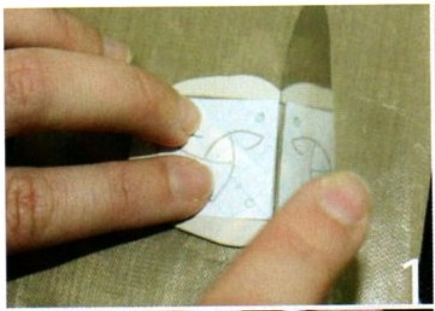
Find out where to buy supplies, *page 79*
See Safety Basics, *page 76*

Videos & Basics

Check out these bonus tutorials for fundamental techniques used in this project:

- Annealing **B** 🎞
- Rolling metal clay **B** 🎞
- Making paste and slip **B** 🎞
- Patinating with liver of sulfur **B** 🎞

B Basics, *page 73*
🎞 Videos, www.artjewelrymag.com/videos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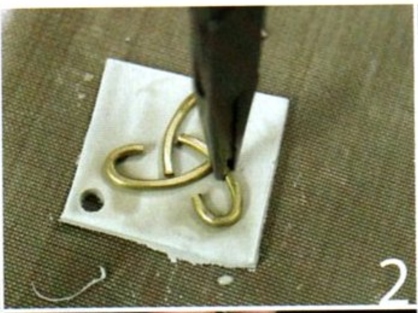
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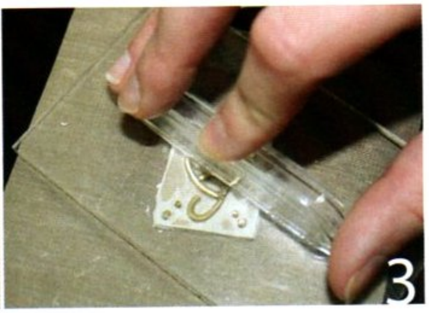
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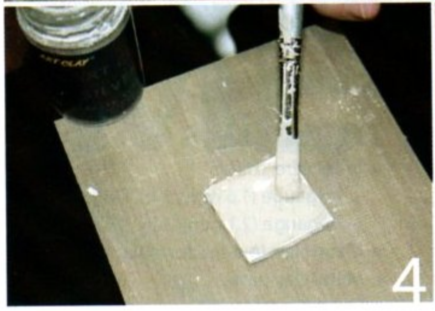
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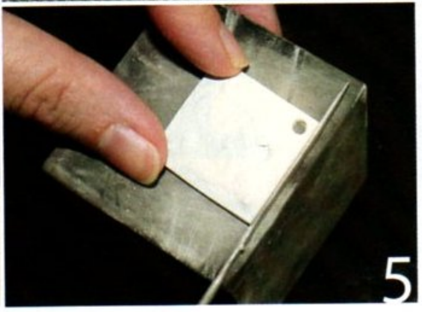
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Part 2: Metal clay

Roll out the metal clay. Lightly coat your hands, a plastic roller, a flexible Teflon sheet, a straw, and a clear, hard plastic sheet with hand balm or olive oil. Roll out about 14 g of metal clay to 6 playing cards (1.5 mm) thick **B** ⊞.

NOTE: Do the next series of steps while the clay is wet (see the "Metal Clay Dryness" chart, *right*). If the clay starts to dry out as you work, use a flat-tip paintbrush to apply distilled water to the surface of the clay.

Make the clay panel. Place your template on the clay, and use a tissue blade or clay scraper to cut the clay along the edges of the template **[1]**. Remove the template.

Cut a hole for the bail. Use an end of the straw to cut a hole for the bail at least ⅛ in. (3 mm) from one of the panel's corners.

Position the wire pieces. Using chain-nose pliers, grasp a shaped wire flat-side up, and position it on the panel according to your template design. Repeat to position the remaining shaped wires on the panel **[2]**.

To create the dots, gently press the small pieces of wire vertically into the clay.

Press the wires into the panel. Place a clear, hard plastic sheet over the panel. Using even pressure, embed the wires about two-thirds deep into the panel **[3]**.

Apply paste. Use a flat-tip paintbrush to apply a layer of thick metal clay paste **B** ⊞ over the front of the panel, covering the wires **[4]**. Allow the paste to air-dry completely. If the wires are still visible, apply another layer of thick paste, and allow the panel to dry completely.

online extra

To learn about the differences between metal clay paste, overlay paste, and oil paste, check out "Which Silver Paste Do I Use?" at www.artjewelrymag.com/reference.

Metal Clay Dryness

Wet	A lot of moisture; very pliable
Semi-dry	Some moisture; firm, holds its shape
Mostly dry	Nearly devoid of moisture; rigid
Completely dry	No moisture; can be fired

Refine the edges. Place the panel on a rubber block, and use a flat needle file to refine the panel's edges **[5]**.

NOTE: Do not file or use sandpaper on the surface of the panel.

Fire the panel. Place the panel on a kiln shelf, and insert the shelf into the kiln. Ramp the kiln to 1200°F (649°C) and hold for 30 minutes.

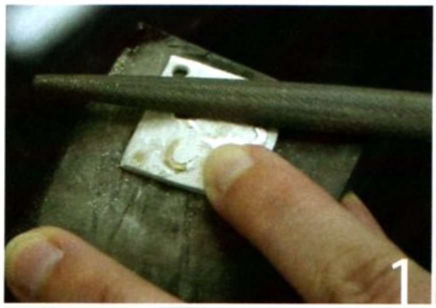
NOTE: Do not exceed a firing temperature of 1400°F (760°C); higher temperatures can melt the brass or develop firescale on it.

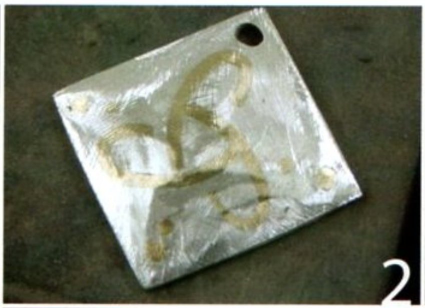
Remove the shelf from the kiln, and allow the pendant to air-cool.

filing tips

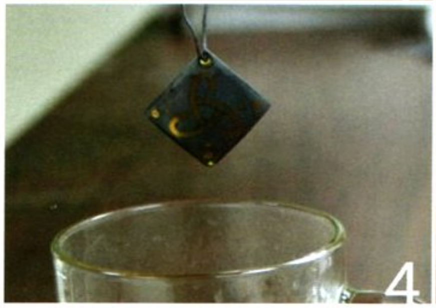
Use these filing techniques to smooth the surface of your pendant:

- Use long, slow strokes only in a forward motion; files don't cut on a backward stroke.
- To minimize the chance of creating gaps between the brass wire and the silver, always file from the edge of the panel toward its center.
- After you've filed the panel from one edge, rotate the panel on the block to file it from another edge. Repeat until you've filed the panel from all four edges.
- If you need to use some muscle, stand up to file.
- Use magnification to check for gaps between the silver and the brass wire.





Process photos by Jackie Truty.



Part 3: Finishing

File the surface of the pendant. Place the pendant face-up on the rubber block, aligning one edge of the pendant with one edge of the block.

Stroking from the outer edges of the pendant toward its center **[1]**, use the flat side of a half-round hand file to remove a layer of silver and brass to reveal your design **[2]**. (See "Filing Tips," *opposite*.) If you detect gaps between the silver and brass, see "Troubleshooting Gaps," *right*.

Continue to file the surface until the complete wire design is visible and the surface of the pendant is even.

Remove scratches. Use a small flat file in a finer cut than the hand file to remove any large scratches made by the hand file.

Refine the surface. To create a mirrorlike finish, wet-sand the surface of the pendant using sanding pads in progressively finer grits. Sand the entire surface in one direction with the coarsest grit. Then rotate the piece 90° and sand with the next finest grit **[3]**. Repeat this process until the surface is even and smooth.

TIP: When sanding metal clay, rinse your piece and the sanding pads often to keep the pads from clogging. If you're using a bowl of water to keep the pads wet, change the water between courses of sanding. If coarser grit from previous courses remains in the bowl, you'll scratch the metal.

Clean the pendant. Make a paste of baking soda and water. Rub the paste on the pendant's surface. Holding the pendant by its edges to avoid getting finger oils on the metal, rinse the pendant with water, then dry it with a paper towel.

Patinate the pendant. Add liver of sulfur **B** ▦ to a container of hot water according to the manufacturer's instructions. Fill a second container with clean, cold water.

Loop a piece of scrap wire through the hole in the pendant, and dip the pendant in the liver of sulfur solution until the silver turns black. Use the scrap wire to remove the pendant from the solution **[4]**.

NOTE: The brass will not darken.

Swish the pendant around in the container of cold water. Remove the pendant, and dry it with a paper towel.

Polish the pendant. Set the pendant on the rubber block. Dab silver polish on a soft cloth, and use it to gently buff the pendant's surface to a mirror finish **[5]**.

NOTE: Don't use too much pressure when buffing, or you could remove the patina.

troubleshooting gaps

Filing the surface of the pendant might cause gaps to develop between the brass wire and the silver. Don't panic. Usually, as you continue to file, the wire will flatten and fill these gaps.

Filling gaps

If additional filing causes a gap to get bigger rather than disappear, stop filing immediately, and follow these instructions to fill the gap.

- Use a fine-tip brush to generously apply overlay paste to fill any gaps.

  NOTE: Overlay paste can be fired at 1200°F (649°C), resulting in less shrinkage during firing.

- Allow the paste to dry completely.
- Refire the panel in a 1200°F (649°C) kiln for 30 minutes, and allow it to cool completely.
- Resume filing to remove excess overlay paste and to reveal the brass-wire design.

Loose wires

If a wire comes out of the panel, follow these instructions to secure the wire with overlay paste.

- Use a fine-tip brush to apply overlay paste to the impression.
- Press the wire back into the panel.
- Allow the panel to dry completely.
- Refire the panel at 1200°F (649°C) for 30 minutes, and allow it to cool completely.
- Resume filing to reveal the brass-wire design.

Add a bail. Attach a bail to the pendant. I used a gold-filled prefabricated snap-on bail to complement the gold tones of the brass inlay.

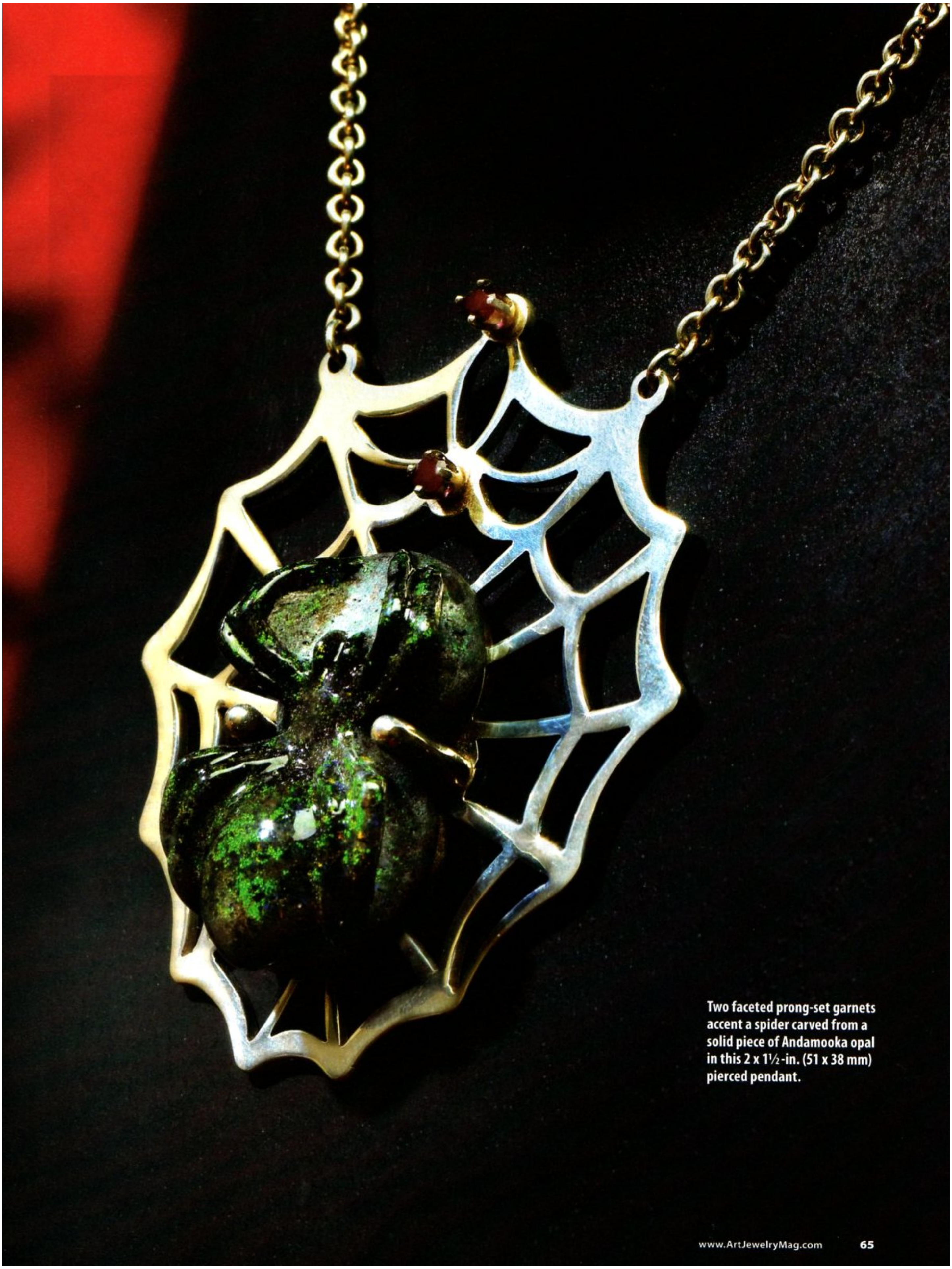
PROJECT
INTERMEDIATE/ADVANCED | METAL

Think Two Prongs Can't Secure a Stone? *Think Again!*

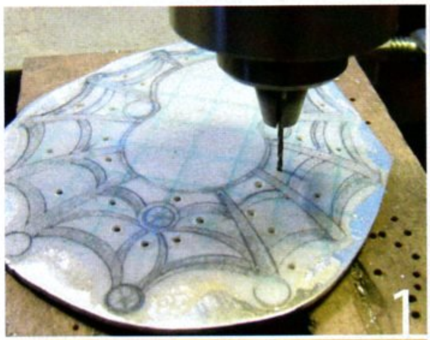
Use sturdy, strategically placed prongs to set a custom-cut stone.

by Jessica Dow and Mark Anderson

There's a trick to using only two prongs to secure a stone to a piece of metal, and it's not using epoxy. Our custom-carved spider stone has side indents that allow us to secure it with just two sturdy prongs. Because the prongs are made of thick wire, there's plenty of room to file a little notch on the inside of each prong. Once pushed against the stone's edge, those notches, coupled with the stone's indents, help grip the stone securely. If your stone isn't shaped like ours, you can still use the notched prongs to hold it, but you may need more than two.



Two faceted prong-set garnets accent a spider carved from a solid piece of Andamooka opal in this 2 x 1½-in. (51 x 38 mm) pierced pendant.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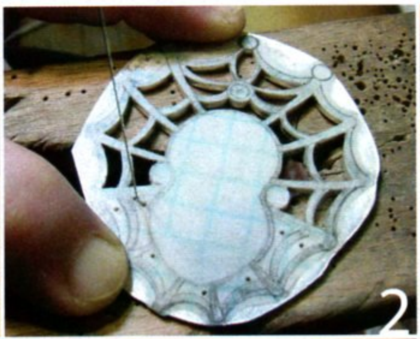
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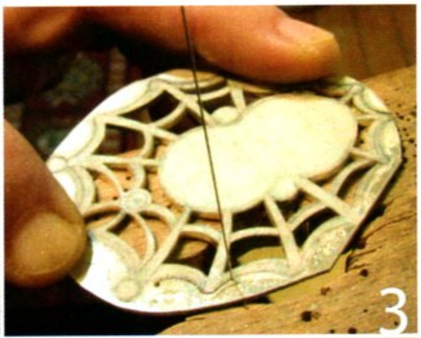
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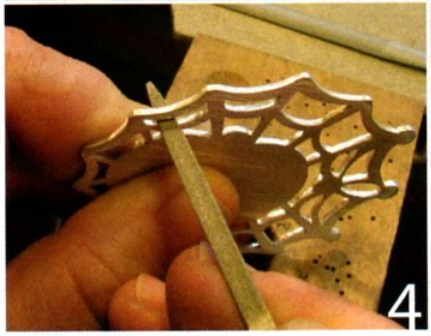
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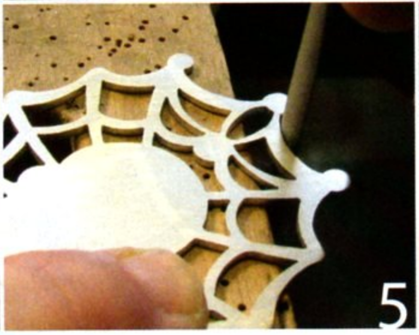
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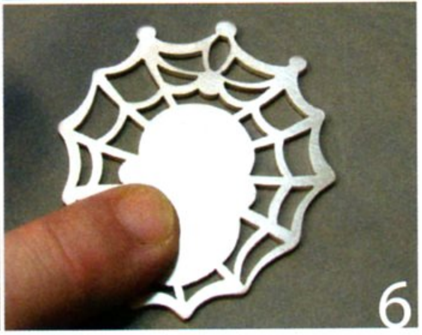
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Preparation

Select your center stone. Choose a large center stone that has a flat back. Our stone is a custom-carved rainbow Andamooka opal. It's special because it has two indents opposite each other; these indents allow us to use only two large prongs to securely set it. To secure your stone with just two prongs, you could use any material with indents on opposite sides, such as rough drusy rock, irregular beach glass, or freeform cabochons. If your stone doesn't have indents, you'll need at least three prongs equally spaced around the stone to ensure that it's securely set.

Draw your template. Draw a cross on graph paper, and center your stone on top of the cross. Trace an outline around your stone, leaving a 0.5 mm (or smaller) border around it. After you pierce the backplate, you'll file this border away so the metal will be flush with the set stone.

Remove the stone, and then draw the outline and design for your backplate, using a pencil to mark all the areas you want to pierce.

NOTE: Make all the supporting lines in your design of similar weight and no less than 2 mm (5⁄64 in.) wide, which is thick enough that the metal will remain durable after you pierce and file it.

Note on your template where you want to position each 2 mm (5⁄64-in.) wire prong for the center stone. If you want to add accent stones, as we did, note the positions for the stones' settings.

Draw at least one place to attach a jump ring so you can connect your pendant to a chain. We wanted two jump rings at the top of the design, so we drew two 5 mm (3⁄16-in.) circles of metal; they're just large enough for us to drill a 2 mm (5⁄64-in.) hole to fit each jump ring.

Glue your template to the metal. Using white glue, attach your template to a clean, flat piece of 16-gauge (1.3 mm) sterling silver sheet. Use a small amount of glue, and smooth the paper with your fingers. Allow the glue to dry completely.

Backplate

Drill the areas to be pierced. Using a center punch on a steel block, create a dimple at each pencil mark. Place your metal sheet on a wooden surface, and drill out all the holes, using a #60 drill bit **[1]** B.

Pierce the design. Thread your saw blade through the drill hole closest to the center of the design. Carefully saw out that pierced section, following the lines on your template. When you're piercing B 🎬, always cut out the inner areas of a design first **[2]**, and work outward from the center. Because the outer edge of the backplate provides extra support and stability, always saw it last **[3]**.

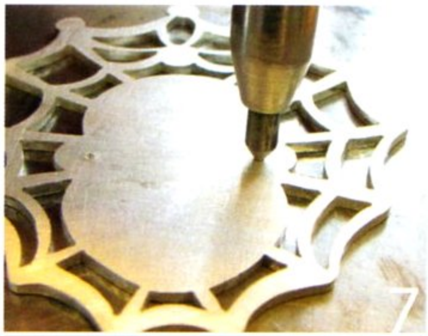
TIP: Use sharp, high-quality saw blades to achieve clean results with intricate piercing work.

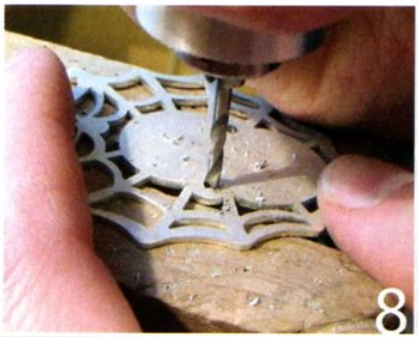
Remove the template. To remove the glue and paper from the template, soak your pierced backplate in a solution of warm water and dish detergent. Using a soft bristle toothbrush, clean the metal thoroughly, and allow it to dry.

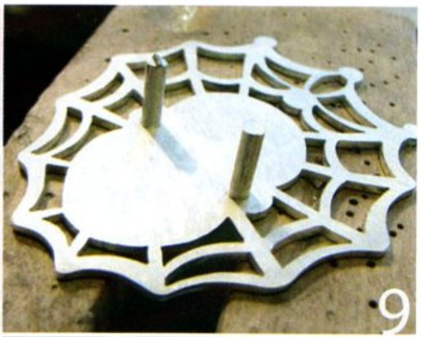
Clean up the backplate. Using needle files, clean up the interior **[4]** and exterior pierced edges **[5]** until they're smooth. Sand the front and back of the backplate with sandpaper **[6]** B until the metal is smooth and even.

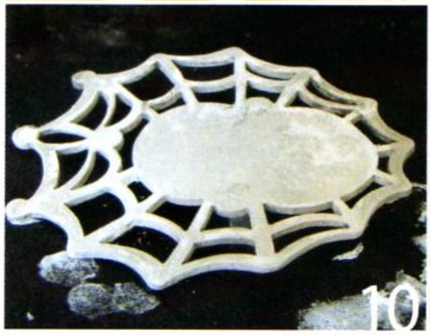
Using a flex shaft or buffing machine and soft buffs, pre-polish the metal with white diamond or tripoli compound.

It's much easier to get a clean, polished metal surface after soldering if you do a thorough polishing job at this phase. Make sure you've removed all traces of the sanding process so the metal is smooth and polished.









Prongs and accent settings

Drill the prong holes. Place your center stone on the backplate, and carefully mark where your prongs will be. Remove the stone, place your backplate on a steel block, and use a center punch to dimple the spots you'll drill for the prongs **[7]**.

Place the backplate on a wooden surface. Using a 2 mm drill bit, carefully drill a hole for each prong **[8]**.

Make the prongs. Using a jeweler's saw, cut two 11 mm (7⁄16-in.) pieces of 12-gauge (2.1 mm) sterling silver wire. Use a coarse flat file to flatten the ends of each wire.

Insert the wires into the backplate's holes until the end of each wire is flush with the back of the backplate. This will be a tight fit; simple pressure should hold the wires in position **[9]**. If it's not a tight enough fit, you may have to adjust the position of the prongs in the charcoal block prior to soldering.

Prepare to solder. Coat both sides of the backplate with firescale retardant, such as a solution of one part boric acid and three parts denatured alcohol.

Place the backplate front-side down onto a charcoal block, and firmly press the prongs into it **[10]**. The backplate should be flush to the surface of the charcoal block in order to keep the prongs in place and prevent the backplate from warping during soldering.

Solder the prongs. Using liquid flux, place a small amount of hard solder **B** onto the back of each prong join. Heat the entire piece **[11]** until the solder flows. Allow the assembly to cool slowly **[12]**.

Remove the assembly from the charcoal block, and turn it over so the prongs are facing up. Place liquid flux and one very small pallion of hard solder as close as possible to each prong. Heat the piece until the solder flows. Allow the assembly to cool completely.

materials

- Large center stone
- Sterling silver:
  - 16-gauge (1.3 mm) sheet: 2 x 3 in. (51 x 76 mm)
  - 12-gauge (2.1 mm) wire: 1 in. (25.5 mm) or longer if your stone needs more than two prongs
- Two 3 mm round prong settings
- Two 3 mm faceted accent stones
- Chain with 2 jump rings at ends

toolboxes, *page 76*

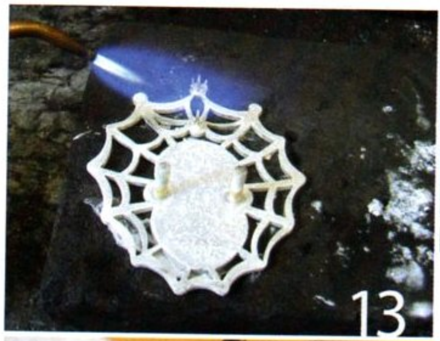
- Sawing/piercing
- Soldering
- Stone setting
- Finishing

additional tools & supplies

- Gorilla Glue or Elmer's white glue
- Boric acid
- Denatured alcohol
- Abrasive radial bristle disks: fine
- Burs: 2.9 mm setting bur, 2.3 mm cup bur, 1 mm cup bur

Find out where to buy supplies, *page 79*
See Safety Basics, *page 76*

► Sturdy 16-gauge (1.3 mm) sterling silver sheet is an excellent choice for this pierced project — it's strong enough to support the thick carved spider stone even after it's pierced.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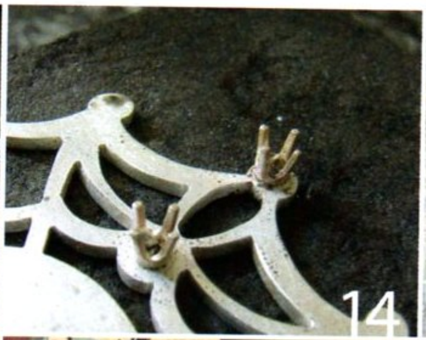
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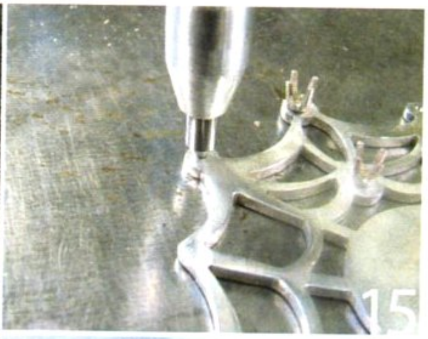
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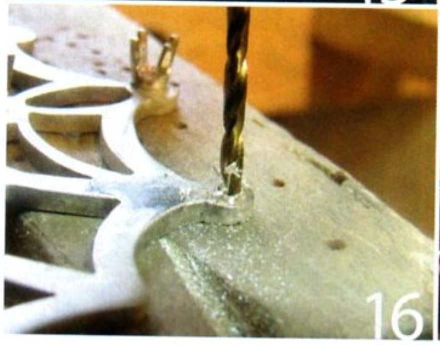
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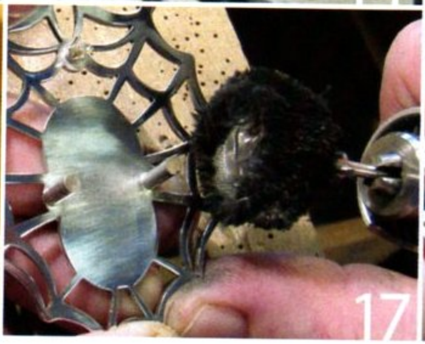
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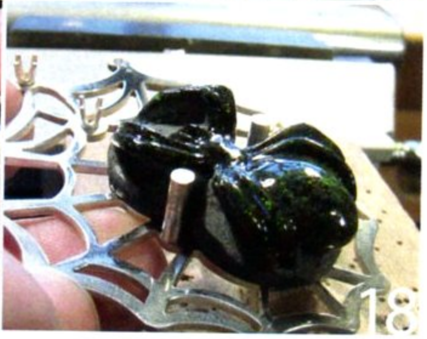
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Videos & Basics

Check out these bonus tutorials for fundamental techniques used in this project:

- Drilling/piercing B 🎥
- Sawing B 🎥
- Sanding B
- Soldering B
- Polishing metal B

B Basics, *page 73*
🎥 Videos, www.artjewelrymag.com/videos

Sweat solder the small accent settings. Turn two premade prong settings upside down, and place a small amount of flux and one pallion of medium solder on the back of each. Heat the prong settings gently, just until the solder flows, then remove the heat immediately.

Add a small amount of flux to the backplate on the areas where you will position the accent settings. When the settings are cool, place them right-side up in position on the backplate. Heat the piece **[13]** until the solder on the prong settings flows. Allow the piece to cool completely **[14]**, then pickle and rinse it.

Finishing and setting

Drill the jump ring holes. Using a center punch, create dimples **[15]** where your jump rings will go. Then, drill the jump ring holes using a 2 mm drill bit **[16]**. Be careful not to drill a hole exceeding 2 mm ($^5/_{64}$ in.), or these areas will become too weak.

Clean up the pendant. Position your center stone, and double-check the edges of the metal around the stone **[17]**. If necessary, use needle files to remove any excess metal that extends beyond the edge of the stone or around the prong settings. Be careful not to file away the solder joins of the prong settings.

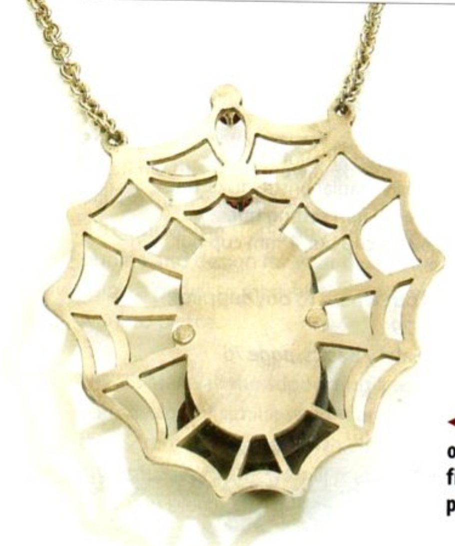
Polish the piece. Finish the backplate with a progression of fine, abrasive, radial bristle disks in a flex shaft. Then, polish the piece B using red rouge compound **[18]**.

Round the prongs. Using a 2.3 mm cup bur in a flex shaft, gently round the tips of the prongs until they're smooth **[19]**.

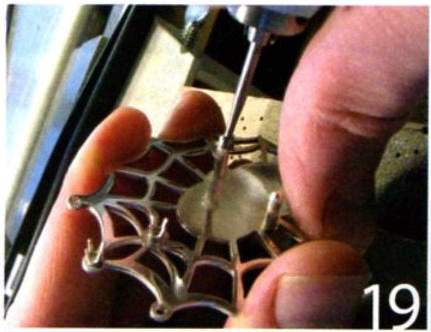
File notches in the prongs. You must add small notches on the inside of each prong to help secure the bottom edge of the stone.

Using a flat needle file at an angle, remove a small amount of metal from the inner base of each prong **[20]**. Remove only a tiny amount of metal at a time **[21]**, and check the fit of your stone frequently.

TIP: When you're filing notches in prongs, position a scrap sheet of metal on the pendant, against the prongs. This controls the height of the notch and prevents you from accidentally scratching the piece with your file.



◄ **To keep your design looking crisp on the front and the back, use needle files to carefully refine all interior pierced edges.**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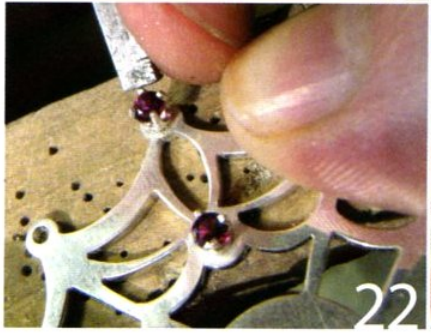
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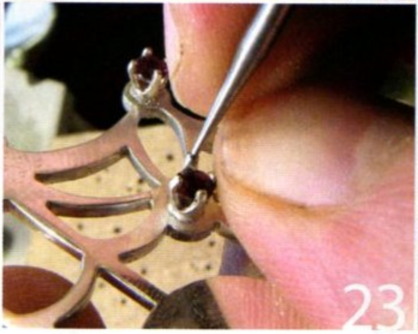
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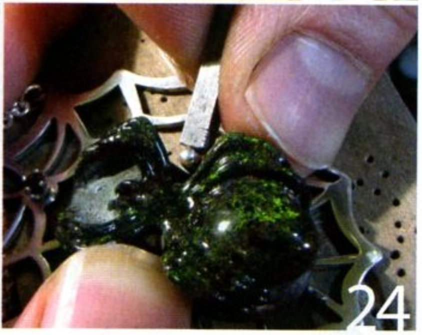

24

Process photos by Jessica Dow.

Set the accent stones. Place your accent stones in their settings to check the fit. If necessary, create a seat in each setting using a 2.9 mm setting bur in a flex shaft.

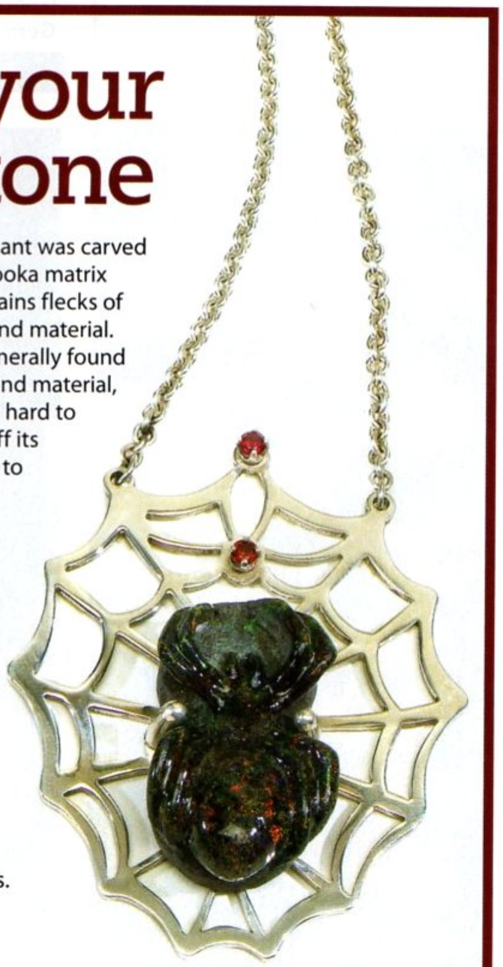
Using gem-setting pliers and/or a prong pusher, gently bend the prongs against the stones **[22]**. Using a 1 mm cup bur in a flex shaft, gently round the tips of the prongs until they are smooth **[23]**.

Set the center stone. Place your pendant on a flat, secure surface, such as a graver's block. Place the center stone between the prongs.

Using a prong pusher and alternating prongs, slowly bend the prongs into position **[24]**. Push the prongs carefully, paying attention to how much pressure you're using, or the stone could crack or break. Continue to slowly bend the prongs inward until the stone is secure and does not wiggle within the setting.

Attach a chain. Using jump rings, attach a chain to your pendant. AJ

carve your own stone



The center stone in this pendant was carved from a solid piece of Andamooka matrix opal, a type of opal that contains flecks of color throughout a background material. This type of matrix opal is generally found with a chalky white background material, making the colors in the opal hard to distinguish. To better show off its colors, this stone was treated to darken the background.

To learn how to plan out, carve, and polish your own spider-shaped stone, check out our article in the upcoming November 2010 issue of *Art Jewelry*!

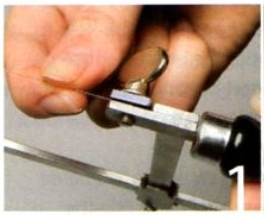
You'll also learn a nontoxic technique to achieve a permanent deep black background to enhance the colors in your own Andamooka matrix opals.

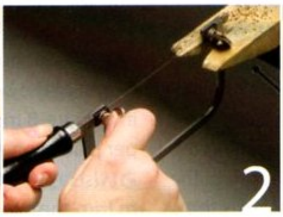
No matter what medium you work in, there are some jewelry-making techniques that are so essential, you'll use them in nearly every project you make. These tutorials will walk you through the beginner techniques that you'll need to learn in order to make the projects in this issue.

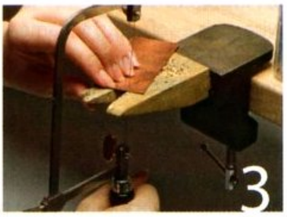
online extras
Look for this icon and find bonus videos online at www.artjewelrymag.com/videos.

metalworking techniques

SAWING







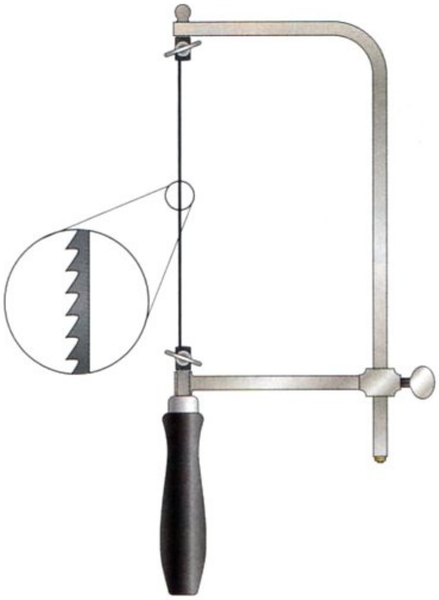
Select a saw blade that is the correct size for the gauge (thickness) of metal that you are going to cut.

To thread a saw blade, insert the blade, with the teeth of the blade facing down and away from the handle, into the top wing nut of the saw frame, and tighten the wing nut. Brace the handle in the hollow of your shoulder, and apply pressure to the saw frame against your bench pin. Maintaining pressure, insert the bottom of the blade into the wing nut closest to the handle **[1]**, and tighten the wing nut **[2]**.

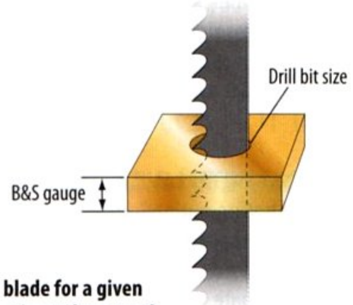
The blade should be taut and should make a high-pitched "ping" when you pluck it with your thumbnail. If you get a dull sound, reinstall your blade while putting pressure on the saw frame. Then, lubricate the blade with beeswax.

When sawing, sit in an erect posture with the top of your workbench at upper chest level. Slouching or having your work too low causes back and wrist strain and leads to broken blades.

To saw, grip the saw frame loosely in your hand. Use long, smooth motions, using as much of the blade as possible. The blade will work best when it's perpendicular to the metal **[3]**. Putting excessive pressure on the saw frame will make you work harder. Turn corners by sawing in place while turning the metal; trying to turn the saw will break the blade.



◀ **Saw blades come in sizes ranging from 8/0 (smallest) to 8 (largest). Insert the blade into the saw frame with the teeth pointing downward and away from the frame.**

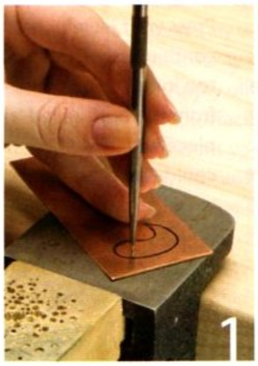


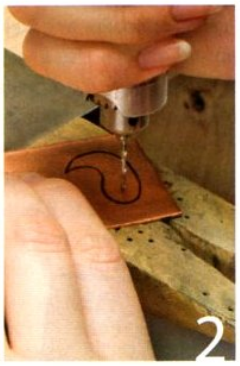
▶ **The best saw blade for a given gauge will have at least three teeth touching the metal at all times.**

DRILLING/PIERCING

Place your metal on a steel bench block or anvil. Tap a center punch with a mallet to create a shallow dimple in the section of the metal you want to remove **[1]**. Place the metal on a piece of wood and drill a hole, using the dimple as a guide **[2]**.

Remove one end of the saw blade from the saw frame. Slide the blade through the hole in the metal, then reinsert the blade into the frame, and tighten. Saw out the inside section of the metal. Release one end of the blade from the saw frame so you can remove the blade from the metal.





online extra
To download a free "Metal Piercing Chart" that will help you select the best saw blade size for your project, visit www.artjewelrymag.com/reference.

metalworking techniques

MAKING A BEZEL CUP AND BEZEL-SETTING A STONE

Use bezel wire to tightly encircle a cabochon, allowing the ends of the bezel wire to overlap **[1]**. Use flush cutters to cut the bezel wire where it overlaps **[2]**.

Bring the ends of the bezel wire together with no gaps, and place the bezel wire on a soldering pad. Flux the bezel wire, place a small pallion of hard solder on the join, and then heat the entire bezel wire with a soft, bushy flame until the solder flows. Remove the heat, then quench the bezel in water. Soak the bezel in pickle, then rinse and dry it.

Test the fit of your bezel by pushing the cab through the bezel from either side; the fit should be very snug. If the bezel is too large, cut the seam (removing the old solder), and resolder. If the bezel is too small, stretch the bezel wire on a mandrel, or start over.

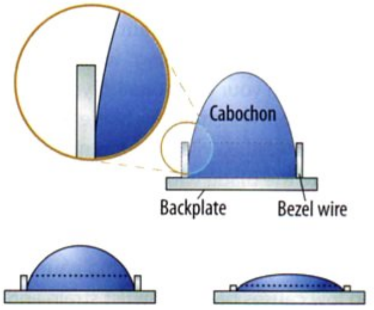
Solder the bezel to a backplate by fluxing both parts and placing the solder pallions so that they touch both surfaces **[3]**. Heat the backplate with a soft, bushy flame until the solder melts, then quench the bezel cup in water. If the entire bezel is not soldered to the backplate, pickle it to remove any flux residues, rinse and dry the bezel cup, and then resolder.

Press the cab into the bezel with thread or dental floss behind it to test the fit **[4]**.

The walls of the bezel cup should extend up just beyond the point at which the stone begins to curve inward (see illustration, *below*); if your bezel is taller than that, it will overshadow your stone; if your bezel is shorter than that, it may not hold your stone securely. A general guideline is that the bezel should be about one-third as tall as the stone.

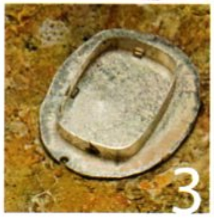
If the bezel is too tall, use the floss to pop the cab out of the bezel. Reduce the height of the bezel by sanding it face down in a figure-8 motion on a piece of sandpaper placed on a flat surface.

Use a jeweler's saw with a 2/0 blade to trim the excess backplate. File the remaining backplate as close to the bezel wall as desired.



The bezel will be secure enough to hold the stone if you position it where the stone starts to curve in.

Place the cab in the bezel. View the bezel like the face of a clock, and, using a burnisher or bezel rocker, gently push the bezel down onto the stone, first at 12:00, then in opposition at 6:00. Repeat at the 3:00 and 9:00 positions. Work around the stone, pushing the bezel down with opposing moves to keep the stone centered and to keep the bezel from getting pleated. Smooth the pushed bezel with the burnisher by rubbing around the outer edges with a consistent pressure. Place masking tape over the stone to protect it, and use a pink rubber wheel in a flex shaft to polish the bezel.



PATINATING WITH LIVER OF SULFUR

Polish your piece before patinating. (If you tumble-polish your piece after patinating, reserve the used shot for future patinated pieces; the liver of sulfur residue will contaminate other pieces.) Oil and dirt on the piece can affect the patina; clean the metal with degreasing soap before patinating.

Prepare a liver of sulfur solution according to the manufacturer's instructions. Dip the metal in the solution for a few seconds, then rinse the metal in cool water to stop the chemical reaction. For a darker patina, continue to dip and rinse the metal. Use a brass brush with soapy water to remove or modify the patina. By using different temperatures and amounts of water to make the solution, you can achieve different colors of patina; experiment to find the result you prefer.

POLISHING METAL

To polish metal, you'll need a buffing machine or a flex shaft tool, plus a separate buff for each kind of pre-polishing and polishing compound that you use. Thoroughly clean your jewelry piece between polishing steps, and take care not to cross-contaminate your buffs and compounds; this could result in scratches in your piece and ruined buffs.

To pre-polish, secure a soft cloth buff on the buffing machine or insert a miniature buffing-wheel bit in the flex shaft. To charge the buff with compound, hold a stick of pre-polishing compound, such as tripoli, against the spinning buff until the buff has a light coat of compound on its edge. Press your jewelry piece against the charged buff, moving the jewelry piece continuously. Don't hold your piece against the spinning buff in one place for too long — you could end up wearing away material or creating scratches from the buff, called "drag marks." Recharge the buff as needed. Clean your piece with detergent and a soft toothbrush. If your piece is suitable, you could also clean it in an ultrasonic machine. Rinse and dry the piece.

To polish, charge a fresh buff with polishing compound, such as rouge. Polish your piece with the buff, recharging the buff as needed, until your piece is uniformly shiny and all evidence of pre-polishing has been removed. Clean, rinse, and dry your piece.

FUSING JUMP RINGS

Fusing is a technique in which you heat metal (in this case, the cut ends of a jump ring) almost to its melting point in order to join it without using solder. Fine silver responds especially well to fusing.

Use two pairs of pliers to grasp a jump ring. Slightly over-form the ring by bringing the ends of the ring past each other, then together so the cut ends are in complete contact.

Place your closed rings in rows on a soldering pad or charcoal block so that the join of each ring faces the front of the pad; this makes it easier to find and watch the joins during fusing.

Dim the room lights so you'll be able to see each ring turn red and "flash" when its join fuses. Light your torch and adjust the flame to about half of the flame length available. Starting with the left rear ring, move the tip of the flame in a circular motion over the ring.

When the ring becomes dull red, move the flame tip to the ring's join, and move the flame in a tight circular motion, uniformly heating both sides of the join until the metal becomes more reflective. This is called the "flash."

When you see the flash, immediately remove the flame. Overheating will result in thinning or completely burning through the ring at the join.

Fuse all the rings, moving from left to right along the last row, then from right to left along the next row. The heat from your torch will preheat the next few rings, causing each to fuse more quickly.

When you've fused all the rings, quench them in water. If necessary, place them in pickle to clean them. (If you used fine silver, you may be able to skip this step.) Rinse and dry the fused rings.

SOLDERING

Clean the metal you plan to solder by sanding it with 400-grit sandpaper. Surfaces must be clean and in complete contact with each other for solder to flow; solder will not fill holes or gaps. Flux all the metal you plan to solder to prevent oxidation and to help solder flow. Heat the entire piece, not just the solder, keeping the torch moving in a circular motion.

If there is more than one solder join in a piece, solder the first one using hard solder, the second using medium solder, and the third using easy solder, as hard solder has the highest melting point and easy solder has the lowest. To keep the solder in a previous join or joins from flowing when you heat the metal again, apply an anti-flux to those areas.

During soldering, the solder will flow toward where the heat is the greatest. If your solder is flowing in the wrong direction, adjust the direction of your flame.

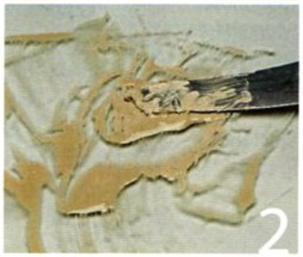
Once the solder flows, quench the piece in water, and place it in a pickle solution to remove oxidation and flux residue. Rinse the piece in clean water.

metal clay techniques

MAKING PASTE AND SLIP

Collect dried, unfired clay scraps and filings, and place them on a glass work surface. Using a tissue blade or razor blade, chop the clay into a fine powder **[1]**. Add some water, and use a plastic or stainless steel palette knife to blend the mixture into a thick paste **[2]**. For a slip consistency, add a little more water, and blend again. Store in a small, airtight container.

1


2

ANNEALING

Annealing restores malleability to work-hardened metal. Place the metal on a soldering surface, flux it, and then heat it evenly with a torch. When the metal has a dull, rose-colored glow, it is annealed. Quench it in water, and soak it in pickle to remove oxides and flux. Then rinse it thoroughly.

SANDING

To give your metal the desired finish, smooth the surface and/or edges by sanding with progressively finer grits of sandpaper. Begin with a coarse grit (220–400) and work up to a fine grit (600–1000). Rub each grit of sandpaper back and forth against the metal in one direction. When you switch to the next-finer grit, rub perpendicularly to the previous grit until you can no longer see the marks from the previous grit.

wireworking technique

OPENING AND CLOSING A JUMP RING

Hold the jump ring with two pairs of chainnose pliers. To open the jump ring, bring one pair of pliers toward you and push the other pair away from you. Reverse the steps to close the jump ring.

ROLLING METAL CLAY

Metal clay dries rapidly, so remove only the amount you will use during a given work session. Store unused clay in an airtight container with a small piece of moist sponge or paper towel. Cover clay with plastic wrap while you are not working with it. Use a spray bottle to remoisten the clay if it begins to dry out.

Apply olive oil or natural hand balm to your hands, tools, and work surface to prevent the clay from sticking. Decide how thick you want your metal clay sheet to be. Make two stacks of either playing cards, mat board, or thickness guides that equal that thickness. Place your lump of clay on your work surface between the two even stacks. Roll the clay to a uniform thickness, using an acrylic roller or PVC tube. Rotate the clay 90° and roll it again.

toolboxes

Chain mail

- Awl or scribe
- Needle files
- Pliers (2 pairs): bentnose, chainnose, or flatnose
- Reading/magnifying glasses
- Shock-absorbing surface (bead mat or towel)
- Tumbler, steel shot, burnishing compound

Finishing

- Brass brush
- Copper tongs
- Files: hand, needle
- Flex shaft or buffing wheel, buffs, polishing compound
- Liver of sulfur or other patina, lidded glass container
- Microcrystalline wax
- Polishing cloth
- Polishing papers
- Sandpaper: various grits
- Scouring pad
- Steel burnisher
- Steel wool
- Tumbler, steel shot, burnishing compound
- Ultrasonic cleaner

Metal clay

- Acrylic or PVC roller
- Airtight storage container
- Brass brush
- Burnisher
- Clear, hard plastic sheet
- Craft knife
- Drinking straw
- Fine-tip paintbrush
- Flexible Teflon sheet
- Kiln, kiln shelf
- Mug warmer
- Needle files
- Needle tool
- Olive oil or natural hand balm
- Pin vise or holder, drill bits
- Plastic wrap
- Playing cards or thickness gauge
- Rubber block
- Shape cutters
- Smoothing tool
- Spatula or palette knife
- Syringe
- Texture sheets or molds
- Tissue blade: flexible, rigid, or wavy
- Tumbler, steel shot, burnishing compound
- Vermiculite, kiln-safe container
- Water: distilled
- Wet/dry sandpaper: various grits, or nail buff/emery board

Sawing/piercing

- Adhesive bandages
- Alligator tape (optional)
- Bench pin
- Center punch: manual or automatic
- Dividers
- Files: hand or needle
- Flex shaft, drill bits
- Jeweler's saw frame, saw blades
- Lubricant or beeswax
- Rubber cement or glue stick
- Safety glasses

Soldering

- Anti-flux
- Binding wire
- Borax (for borax solution)
- Copper tongs
- Fire-resistant surface: soldering pad, firebrick, or charcoal block
- Flux, flux brush
- Pickle pot with pickle
- Solder: hard, medium, easy
- Soldering pick
- Sparker: manual or automatic
- Third hand, insulated cross-locking tweezers
- Torch, various tips
- Sandpaper: various grits
- Tumbler, steel shot, burnishing compound

Stone setting

Bezel setting

- Bezel pusher or rocker
- Burnisher
- Dental floss
- Double-sided tape
- Loupe or Optivisor
- Painter's tape

Prong setting

- Bur: hart or setting
- Flex shaft
- Loupe or Optivisor
- Pliers: prong setting or chainnose
- Prong pusher
- Sticky wax or beeswax

Wirework

- Bench block or anvil
- Cutters: side, end, or flush
- Hammers: chasing, ball peen, cross peen
- Mallet: rawhide or plastic
- Mandrels or dowels
- Needle files
- Pliers: chainnose, flatnose, roundnose, parallel, nylon jaw
- Polishing cloth
- Sandpaper: various grits
- Tumbler, steel shot, burnishing compound

safety basics

Metal clay

- Use your kiln in a well-ventilated area to sinter clay.
- All tools should be dedicated for nonfood use.
- Follow manufacturers' instructions for programming your kiln and sintering times and temperatures.
- Do not torch-fire metal clay pieces that have a core inclusion, such as cork or wood clay.
- Do not sinter or torch-fire metal clay pieces that are not completely dry, as they may explode.

Metals

- Wear eye protection at all times while working with metals, wire, and metalsmithing tools.
- Wear a non-flammable apron to protect your clothing.
- Tie back long hair.
- Work in a well-ventilated area at all times.
- Wear close-toed shoes.
- Do not wear clothing or jewelry that might get caught in machinery or catch fire.

Polymer clay

- Use a calibrated toaster oven to cure clay.
- Cure clay in a well-ventilated area.
- Your oven and all tools should be dedicated for nonfood use.
- Follow manufacturers' instructions for curing times and temperatures.
- Always wet-sand using wet/dry sandpaper.

All media

- Wear a dust mask while working with materials and tools that generate particulates.
- Read all Material Safety Data Sheets (MSDSs) before using a new material, and keep a copy of the MSDS for any material you use.
- Do not use tools or chemicals in ways that are contrary to the manufacturer's intended purpose.
- Wear protective gloves while handling caustic materials or chemicals.
- Keep a properly rated fire extinguisher and a source of clean water near your workstation.
- Keep cutting tools sharp and all tools and equipment properly maintained. AJ

contacts & suppliers | WHERE TO FIND IT

contacts

When contacting artists via e-mail, please put *"Art Jewelry"* in the subject line.

ARTIST PROFILE

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- Brooke Marks-Swanson, www.metalmarks.net

GALLERY

page 41

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BEYOND JEWELRY

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- Rebeca Mojica, www.bluebuddhaboutique.com

suppliers

For contact information for project authors, see Contributors, *page 8*.

SCULPT SWIRLS OF WIRE INTO A PAIR OF POST EARRINGS

page 32

- Wire, seamless sterling beads (FineDings.com, www.finedings.com)
- Butterfly earring clutches (Thunderbird Supply Company, www.thunderbirdsupply.com)

2 METALS, 2 CHAIN MAIL PATTERNS

page 50

- Argentium jump rings (Rio Grande, *right*)
- Gold-filled jump rings (The Ring Lord, www.theringlord.com)

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PREVENT WIGGLY STONES WITH IMPROVED BEZEL-ROLLER TECHNIQUES

page 54

- Bezel roller, bezel pusher, grinding machine, abrasive wheels (Rio Grande, *below*)

A GOOD BEZEL ROLLER IS HARD TO FIND — SO MAKE YOUR OWN!

page 58

- Brass (thrift stores)
- Hacksaw, bench vise, hand files, dowel, two-part epoxy (local hardware stores)
- Grinding machine, abrasive wheels, cut-off disks, flex shaft, jeweler's saw, bezel pushers, handles (Rio Grande, *below*)

EMBED BRASS WIRE IN METAL CLAY

page 60

- Metal clay, overlay paste, sanding pads, brass wire (Art Clay World USA, www.artclayworld.com)

60

THINK TWO PRONGS CAN'T SECURE A STONE? THINK AGAIN!

page 64

- Sterling silver sheet, wire, prong settings, chain, jump rings (Hoover & Strong, www.hooverandstrong.com)
- Faceted chrome pyrope garnets, setting burs, cup burs, abrasive radial disks (Stuller, www.stuller.com)
- Carved spider stone (Martha Borzoni – Different Seasons Jewelry, www.differentseasonsjewelry.com)
- Boric acid, denatured alcohol (local pharmacies)
- Gorilla Glue, Elmer's white glue (local hardware stores) AJ

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general supplier

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